INDIA RUBBER WORLD

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SEPTEMBER, 1946

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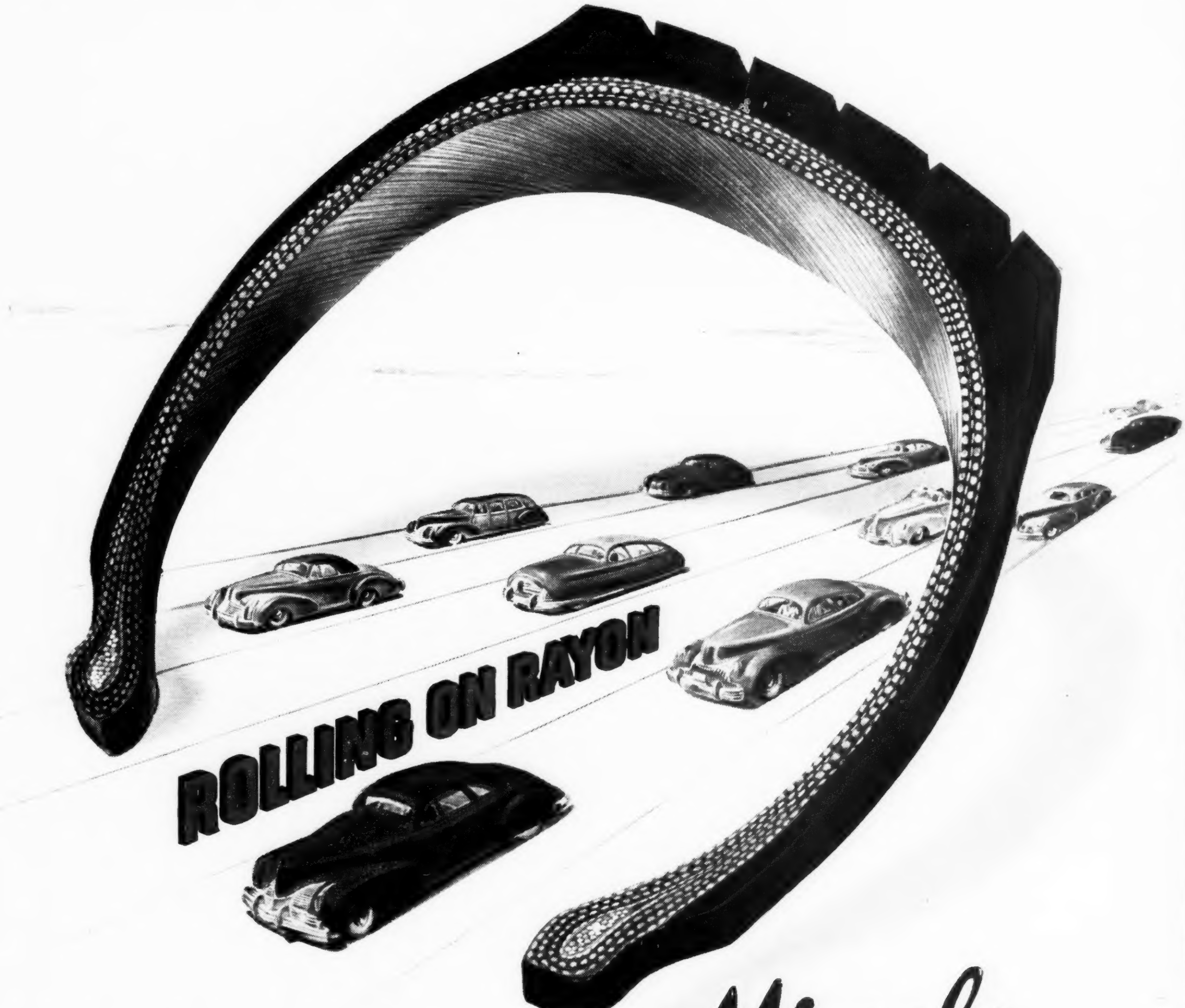

cross section of a *Miracle*

You are looking at a section of a rayon cord tire cut to show you the veins of high strength rayon running through the rubber. Tire makers tell us that these cords make this the safest, longest-wearing passenger car tire that ever traveled a highway.

The experience of the Army, of truck and bus fleet operators, shows that rayon cord tires are less subject to blowout and road failure. That's because rayon runs cooler and maintains higher tensile strength as the tire heats up. With heat breakdown reduced, there's greater mileage in store, and more comfortable riding too, since rayon's greater strength per unit of weight permits a lighter tire that offers less rolling resistance. When passenger car tires of rayon are more generally available, you're in for a real eye-opener in tire performance.

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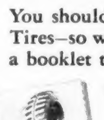
You should know all about Rayon Cord Tires—so we've told the complete story in a booklet that's yours for the asking:



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Send for it, it's FREE.

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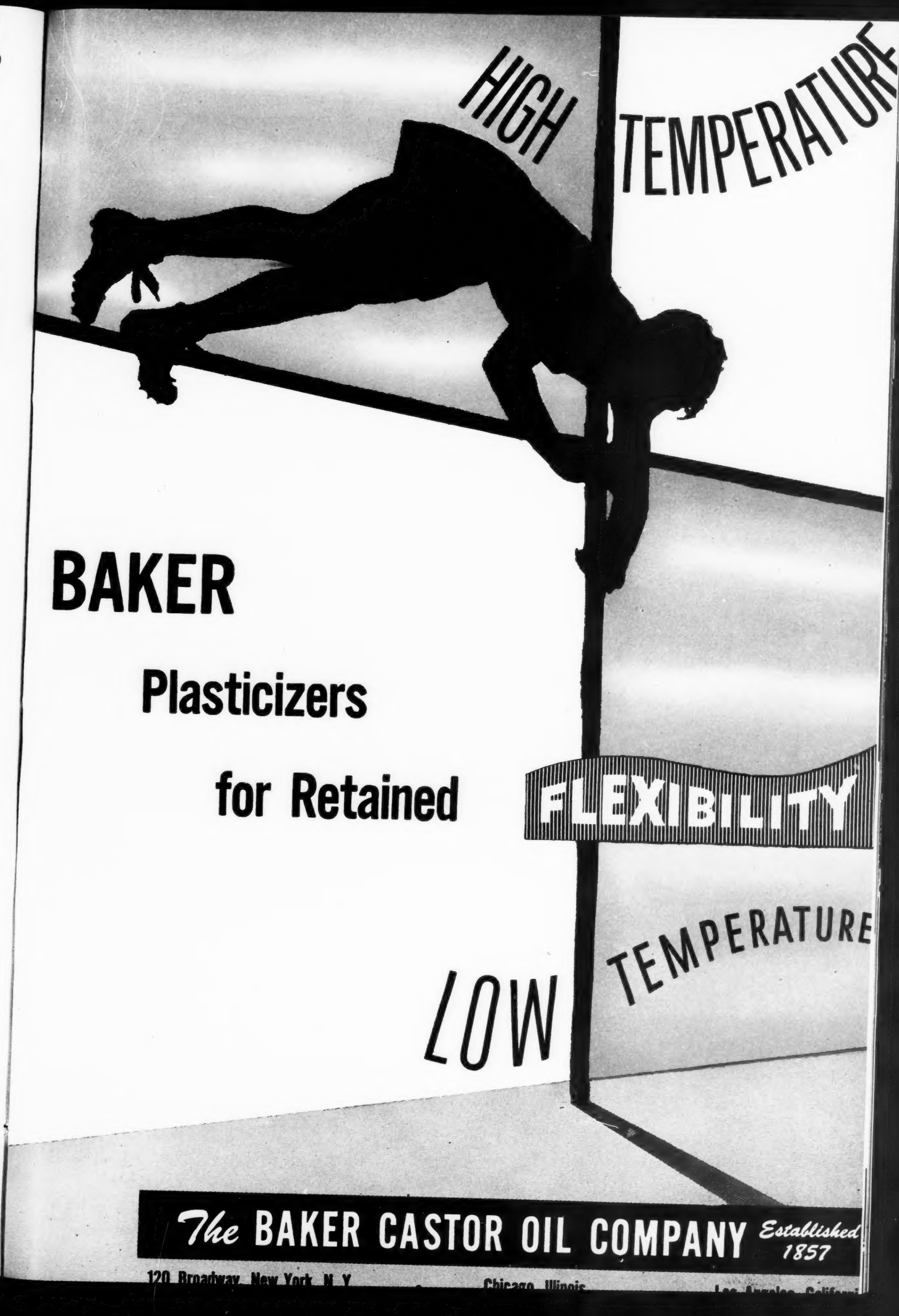
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FLEXIBILITY
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The BAKER CASTOR OIL COMPANY
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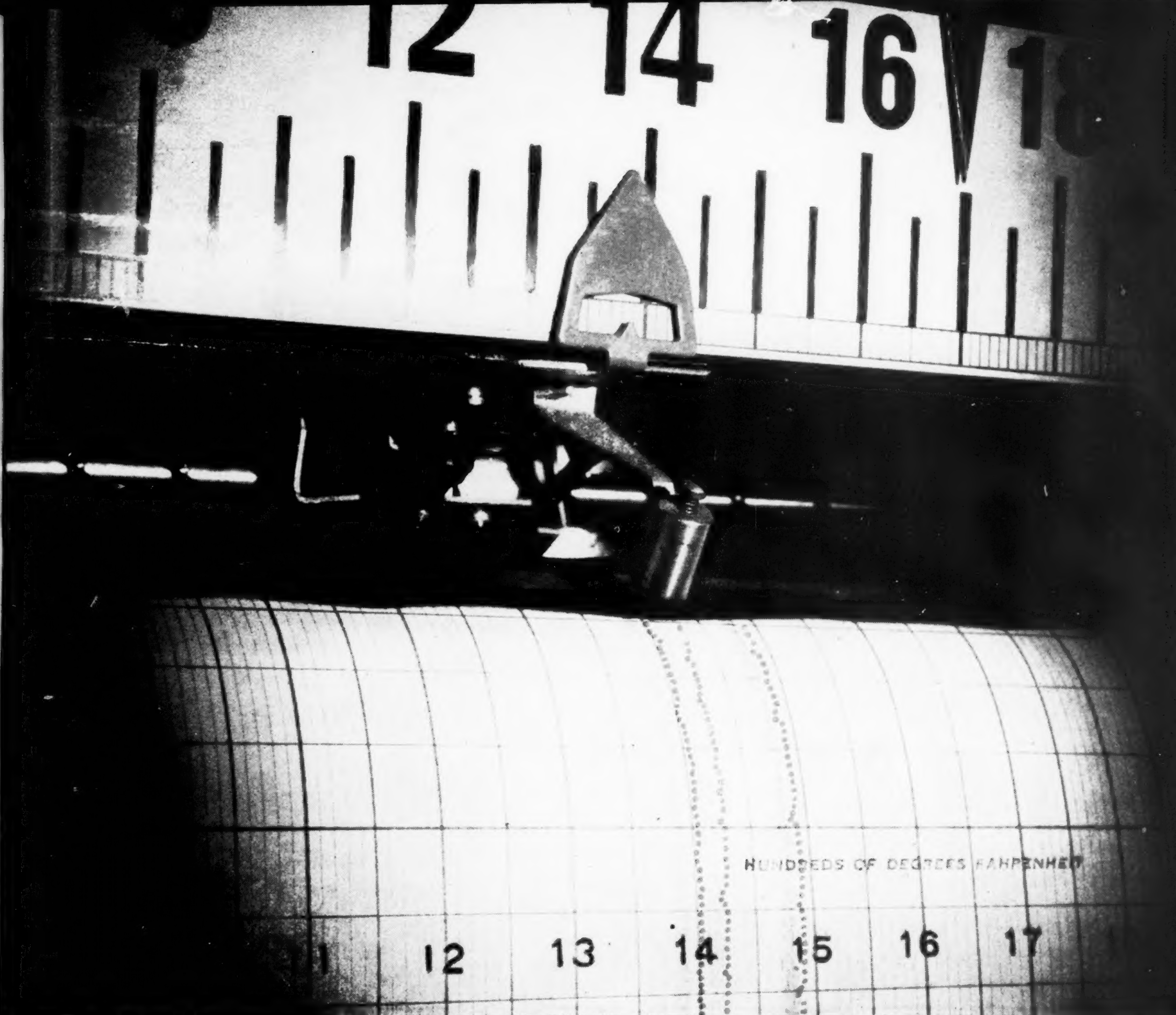

12 14 16
HUNDREDS OF DEGREES FAHRENHEIT
11 12 13 14 15 16 17

Technical Bulletin No. 25 on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

Experimental GR-S Copolymer "X-141"

(The Isoprene-Styrene Copolymer)

with "El-Sixty"-DPG Acceleration

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of:				Permanent Set	Shore Hardness	Tear Resistance Tested at:	
			200%	300%	400%	500%			Room Temp.	100°C.
7.5	1470	840	260	405	520	705	.26	39	142	73
15	1850	685	335	520	780	1035	.26	44	99	85
30	1680	555	410	675	975	1340	.19	47	86	72
45	1565	495	510	800	1130	—	.15	49	92	71
60	1710	505	505	855	1200	1670	.17	49	84	51
90	1640	490	535	875	1220	—	.13	49	102	59

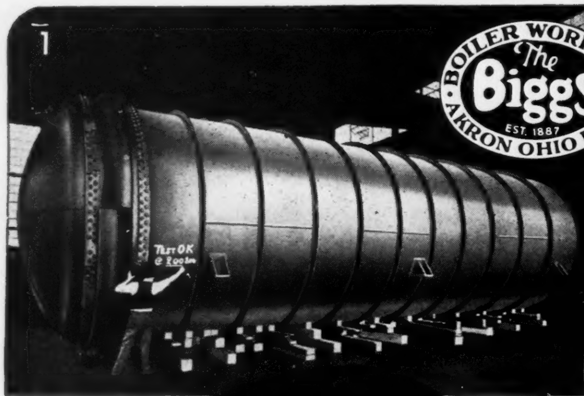
Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum			Compression Fatigue (Goodrich Flexometer)*					Cut-Growth Resistance Tested at 70° C. Inches Failure
	Indentation in mm.	Per Cent Rebound	Shore Hardness	Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise °C.	Dynamic Compression Initial	Dynamic Compression Final	5,500 Cyc.
60	7.79	50.0	46	30.4	15'-5.5	21.1	18.9	22.5	.57

* Test Conditions: 143 lb. Load. 0.175" Stroke. 100° C. Oven Temp.

TECHNICAL Bulletin No. 24 featured "X-141" with a high loading of Zinc Oxide accelerated with MBT. The combination of "El-Sixty" with DPG develops excellent stress-strain properties—especially 300% modulus—with comparatively low set; the tear resistance, particularly at 100° C., is measurably higher than for most compounds with regular GR-S. The higher state of cure developed with the combination accelerator is reflected in improved rebound and notably low heat build-up. Cut-growth resistance is good.

COMPOUND NO. 25

GR-S—X-141	100.0
Sulfur	3.0
"El-Sixty"	2.0
DPG	0.1
Coumarone-indene Resin	3.0
E.L.C. Magnesia	5.0
Zinc Oxide	100.0



The Biggs Boiler Works Co. Est. 1887 Akron Ohio U.S.A.

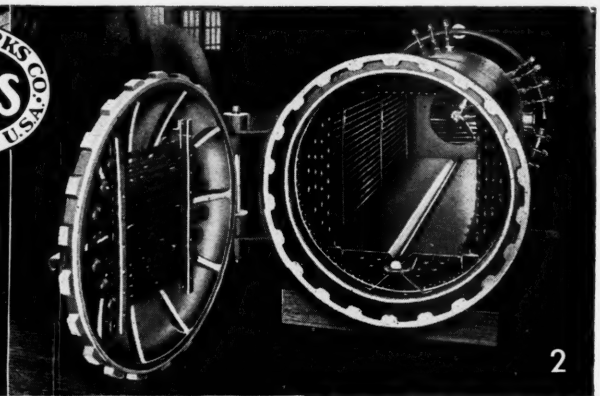


Fig. 1—15-ft. diameter by 45-ft. long horizontal vulcanizer with quick-opening door for vulcanizing rubber linings in large storage tanks. *Fig. 2*—Biggs vulcanizer with special heating manifolds and circulating fan; all sizes, various working pressures.

Biggs

VULCANIZERS and DEVULCANIZERS Have Served the Rubber Industry for More Than 45 Years

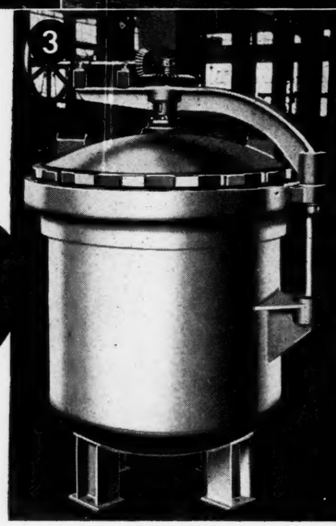


Fig. 3—vertical vulcanizer with quick-opening door. Door is handled by self-contained arm and gear-operating mechanism. Hand or motor operation.

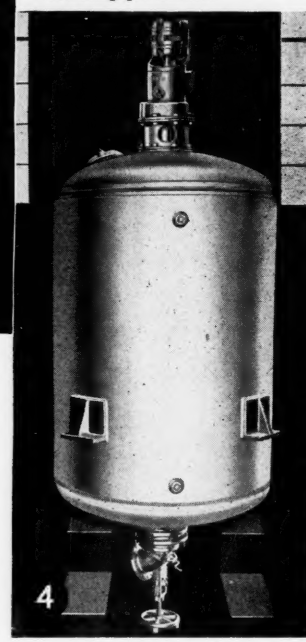
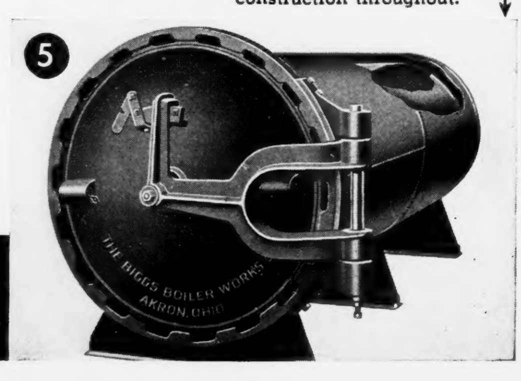


Fig. 4—high pressure heavy duty jacketed vertical devulcanizer with special agitator. Furnished in various sizes.

BIGGS-built vulcanizers and devulcanizers have occupied a prominent place in the development of the rubber industry since its inception. For more than 45 years Biggs has furnished single-shell and jacketed vulcanizers both vertical and horizontal, as well as many different types of devulcanizers to meet various requirements of the reclaim experts. . . . It is a far cry from the old days of bolted doors and riveted construction to Biggs modern all-welded units with quick-opening doors. Biggs vulcanizers and devulcanizers are available in all sizes and for various working pressures — with numerous special features. *Write now for our Bulletin 45.*

Fig. 5—horizontal steam-jacketed vulcanizer with hinge type quick-opening door; all sizes, for various working pressures. Welded construction throughout.



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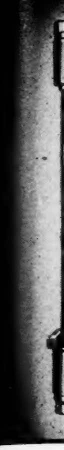

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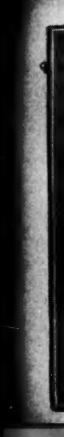

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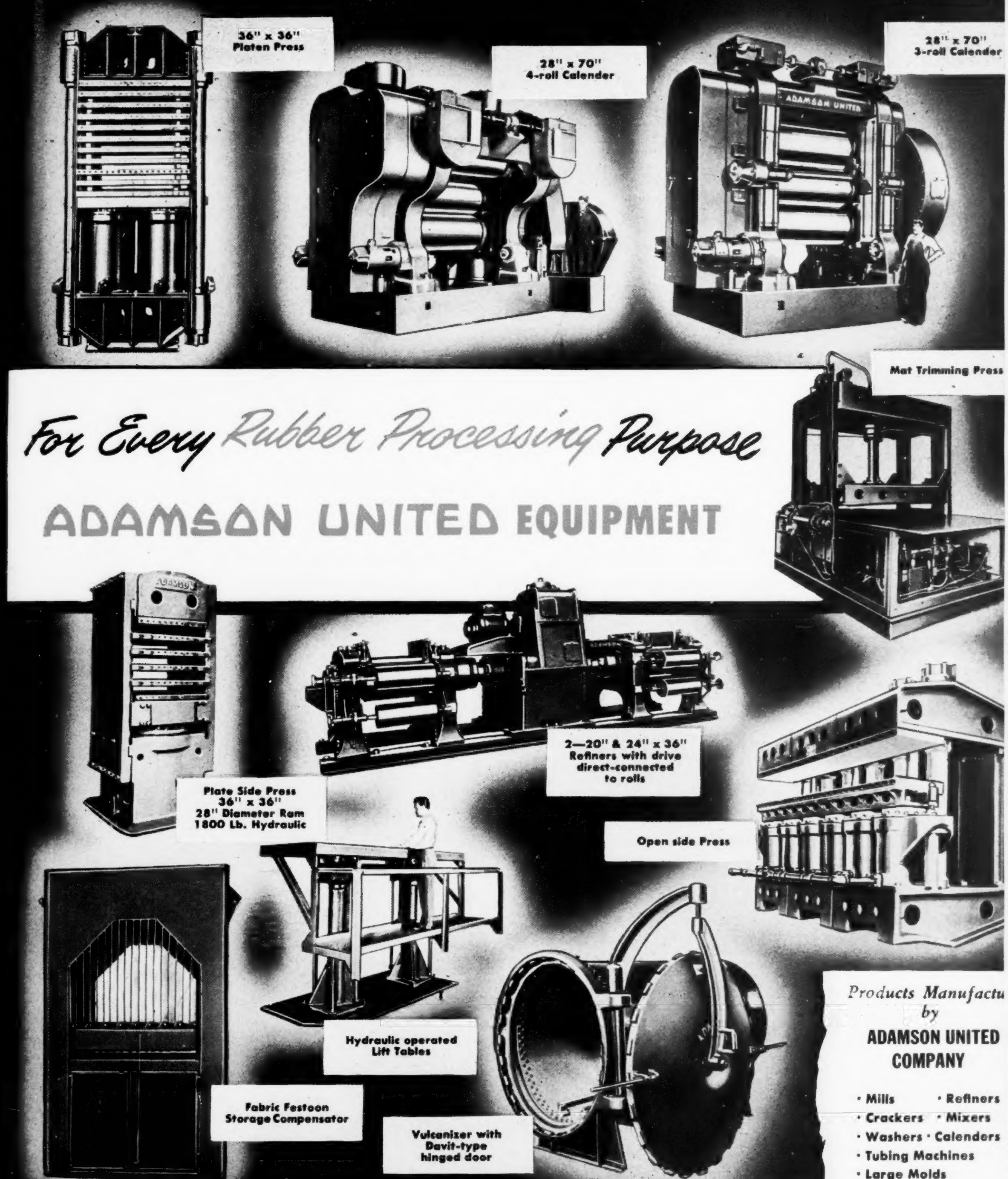

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ST. JOE *Lead-Free* ZINC OXIDE

Here you have typical scenes in the daily life of the famous St. Joe *Lead-Free* Zinc Oxide . . . the warehouse, stocked as well as present day difficulties permit . . . floor trucks heading for the loading platform . . . and the partially loaded box car with its protective siding.

St. Joe Lead-Free Zinc Oxide is the only oxide in this country made by the Electrothermic Process. The flexibility of this process enables us to control the size and shape of the oxide particles to meet individual requirements of oxide buyers.

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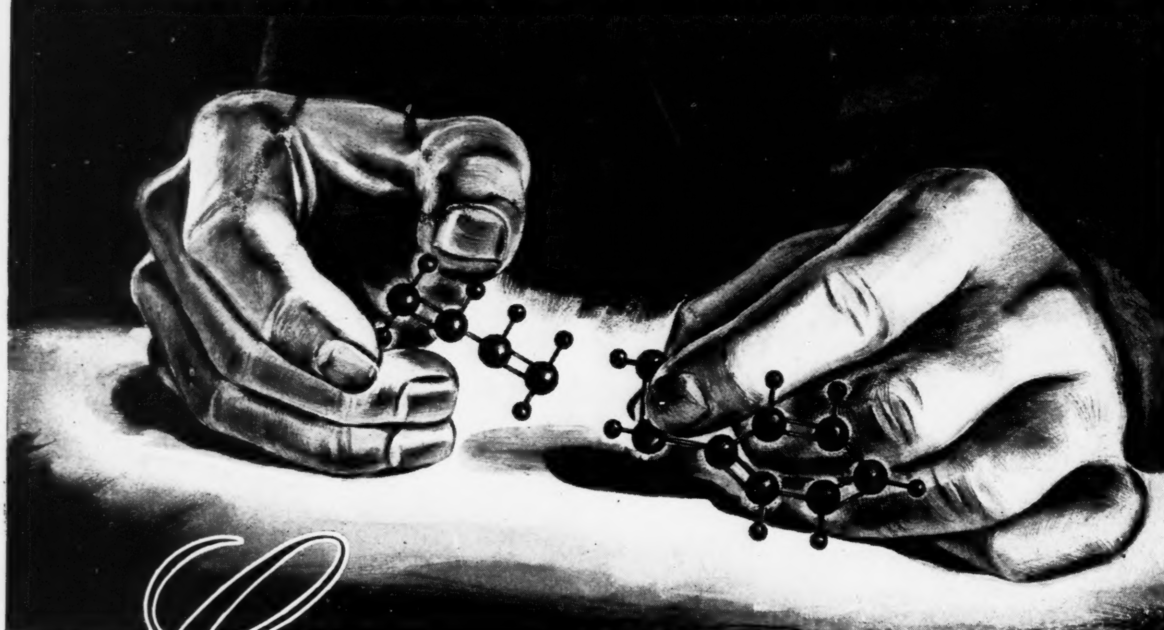
SYNTHETIC RUBBER & RESIN COMPOUNDS



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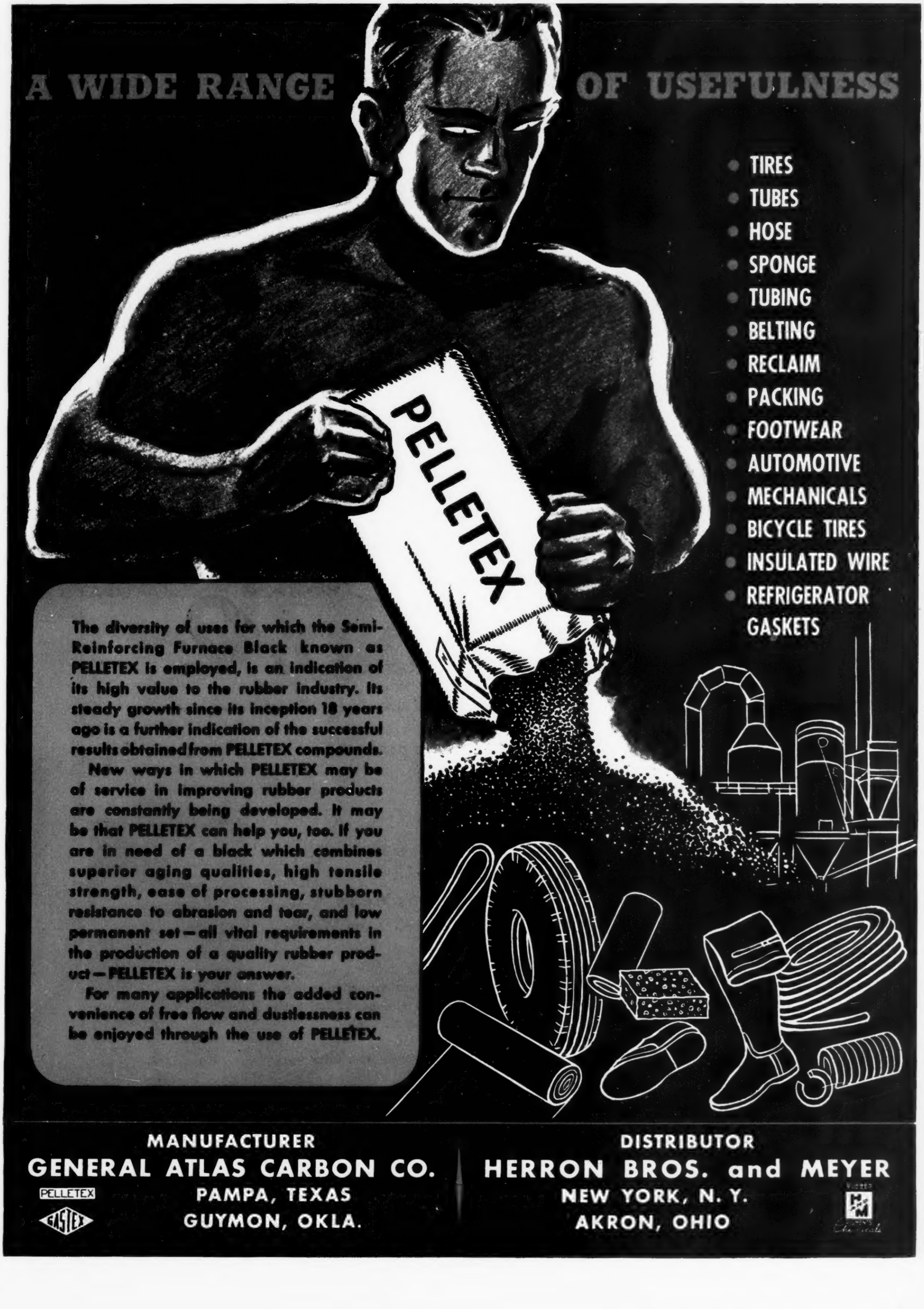
A WIDE RANGE OF USEFULNESS
PELLETEX
• TIRES
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• HOSE
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• TUBING
• BELTING
• RECLAIM
• PACKING
• FOOTWEAR
• AUTOMOTIVE
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The diversity of uses for which the Semi-Reinforcing Furnace Black known as PELLETEX is employed, is an indication of its high value to the rubber industry. Its steady growth since its inception 18 years ago is a further indication of the successful results obtained from PELLETEX compounds.
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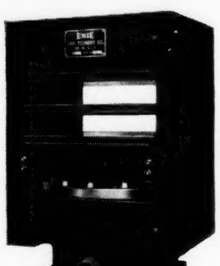

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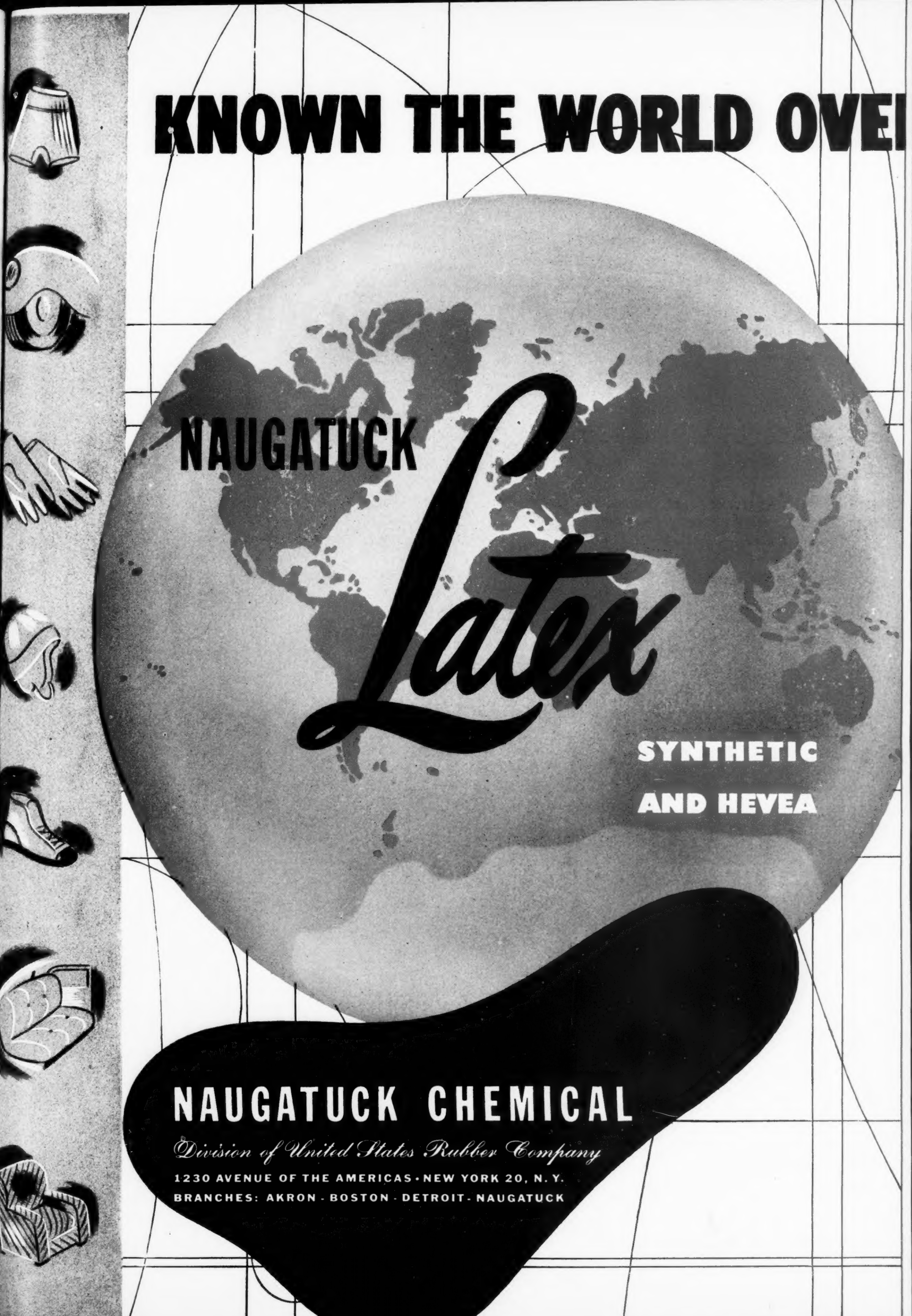

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DUTREX 15

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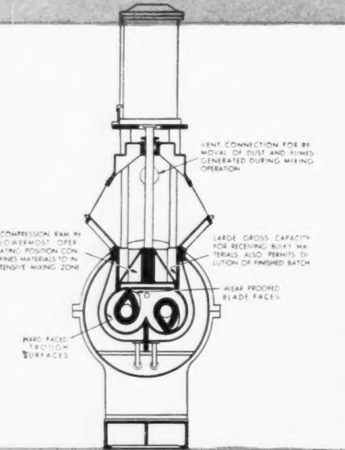
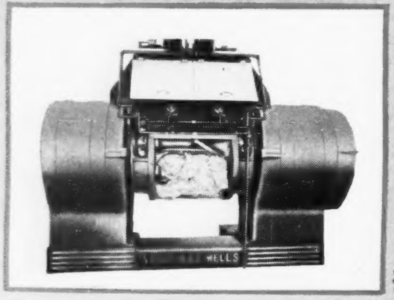
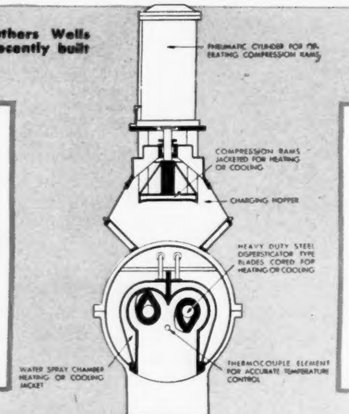
NORTHMASTER INTENSIVE MIXERS



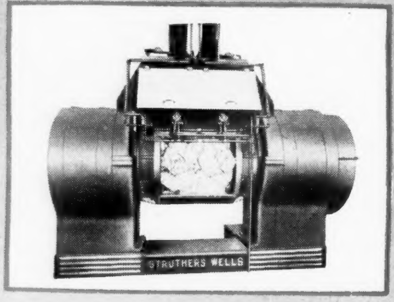
WORKING POSITION

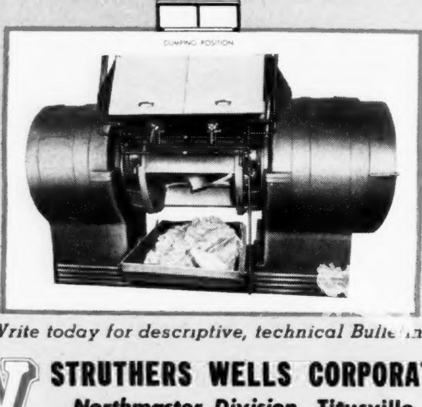
These are actual photographs of a Struthers Wells Northmaster Intensive Mixer which was recently built and installed for a large manufacturer.





DUMPING POSITION





Struthers Wells Northmaster Intensive Mixers are available in working capacity from 125 gallons to 400 gallons for · Pigment Dispersion · Rubber Cements and Dispersions · Mixing, Compounding, Dispersion, Prócessing all kinds of extremely heavy and tenacious materials requiring maximum strength, durability and efficiency Mixers are constructed in accordance with ASME Code requirements, or with separate cooling nozzles. Trough heads are equipped with removable steel liners. Mixing Chamber walls are protected against excessive wear and contamination by the application of Steelite, Colmonoy or other hard facing materials best suited to the materials being processed.

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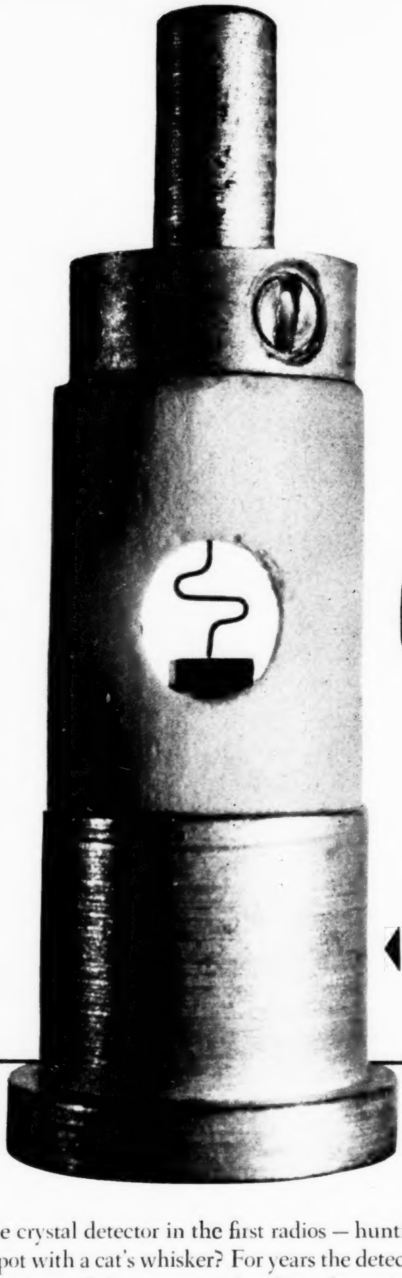

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ENLARGED 8 TIMES

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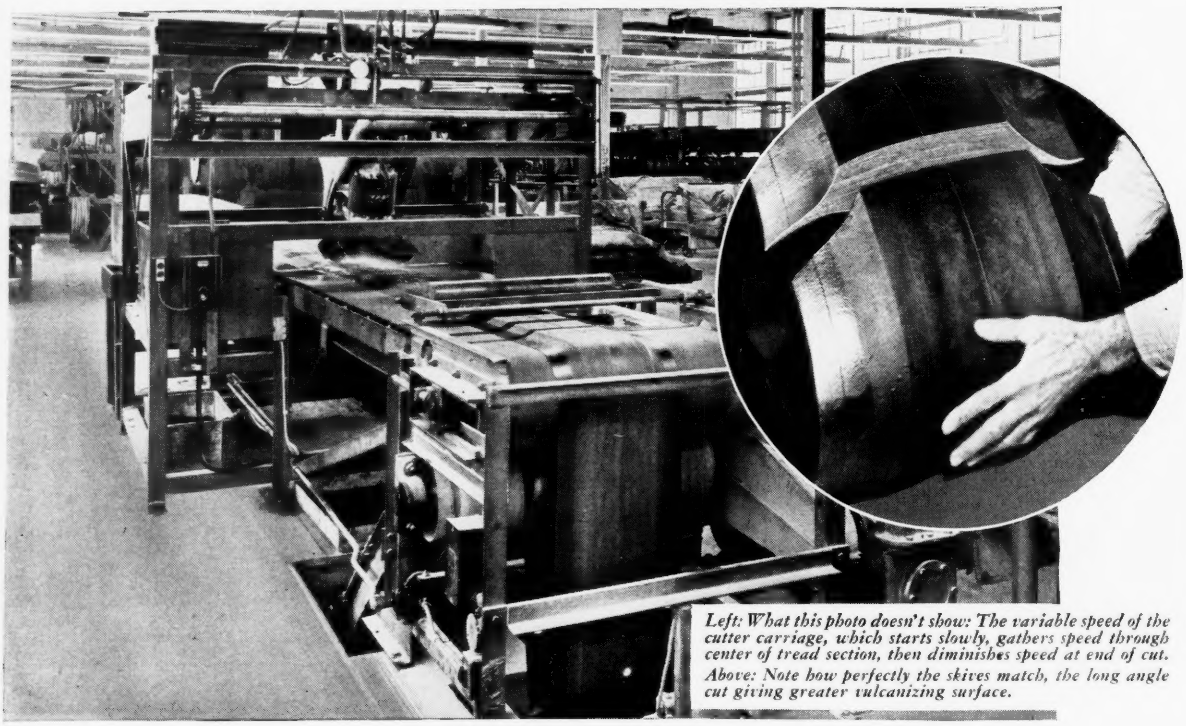
Designed For Accuracy!

Save Time, Material, Labor with the New

NRM MODEL 46 TREAD SKIVER



Left: What this photo doesn't show: The variable speed of the cutter carriage, which starts slowly, gathers speed through center of tread section, then diminishes speed at end of cut.
Above: Note how perfectly the skives match, the long angle cut giving greater vulcanizing surface.

WE wish we could show you a movie which would tell more quickly than words . . . how smoothly and accurately the new NRM Model 46 Tread Skiver goes about its job.

First, you'd see that this machine skives on the fly, in one direction only, with a big 20″ diameter blade. Although it's water-lubricated, you'd notice there's no wasting of water. Following the cut tread sections down the line, a close-up picture of a skive would show the steep angle of the clean cut, (variable from 15° to 45°) which matches perfectly the skive at the other end of the tread section.

Farther down the conveyor line you would see why recutting is a waste practice of the past, for check measurements of the tread sections do not vary more than ⅛″.

Well, we haven't a motion picture showing all this, and the many other advantages of the NRM Tread Skiver, so the next best step is to send you a complete technical description of the equipment and its performance record in actual production . . . Write for this additional information today.

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September, 1946

Volume 114 Number 6

A Bill Brothers Publication

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INDIA

RUBBER WORLD

NATURAL & SYNTHETIC

Volume 114 | New York, September, 1946 | Number 6

The Development of Latex Processes in Great Britain[1]

E. W. Madge[2]

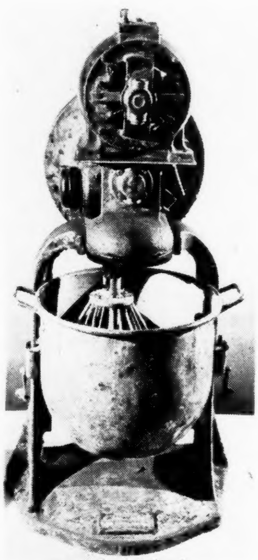


Fig. 1. Original Dough Mixer Used in Latex Sponge Work

THIS paper deals with certain developments of special technical interest, refers to some whose historical aspect is of importance, and deals briefly with one or two of the more unusual wartime and postwar advances in latex technology in Great Britain.

The processes dealt with are divided naturally into three groups: (a) those associated with natural latex; (b) those associated with emulsion polymers; (c) those associated with artificial dispersions. By artificial dispersions are meant dispersions produced from plastic masses by the well-known inversion processes.

Even in this era of synthetically manufactured materials it is probably true to say that many technologists still regard natural latex as having many of the desirable properties required by a commodity of this type.

For certain special purposes synthetic and artificial dispersions have advantages over natural latex, for example, in smallness of particle size, oil resistance, lack of surface drag in the finished product, special forms of adhesion, and so on, but the basic characteristics of natural latex are still of considerable importance.

Natural Latex and Processes

The fundamental attribute of natural latex is that whilst mechanically stable to handling and storage, it is capable of forming by means of a coagulant or by hot or cold sensitization a strong coherent coagulum, high in tear resistance and elongation and of good wet and dry tensile strength. The final vulcanized rubber has also a good elongation and tensile strength. This behavior is designated by saying that the material has good film forming properties.

It is easy enough, given these intrinsic characteristics, to modify them by the addition, for example, of stabilizers and protective agents, but it is not so easy to promote them from first principles during latex synthesis, although considerable advances have been made in this direction.

Natural latex has a low gravity and under properly controlled conditions stores extremely well. The storing properties of natural latex during the war surprised even the most sanguine of the experts.

During the last five and a half years it has been necessary to examine from time to time stocks of preserved latex both in bulk and in drums. Although these stocks were dispersed under emergency conditions on account of possible danger due to enemy action, provided due care was taken concerning such factors as uniformity of storage temperature, type and quality of container lining, and mechanical disturbance at specified intervals, the general condition was excellent throughout the period. The initial preservation condition of the latex was good, and in England danger of freezing did not present the same problems as in Canada and the United States.

This excellence of storage behavior applied to latex preserved with ammonia in the usual way and to latex preserved with sodium pentachlorphenate under alkaline conditions. It was fortunate that a shipment of the latter was unloaded at the critical time as an opportunity was provided of observing this method of preservation over a long period.

These comments only apply to centrifuged concentrate, and information is not available on the behavior of creamed latex under similar conditions.

Intrinsically, of course, there were small expected changes, for example, a tendency for the latex to produce a softer rubber, a slight reduction in stability, and

[1] Presented before the Rubber Division, C.I.C., Toronto, Ont., Canada, June 25, 1946.
[2] Dunlop Rubber Co., Ltd., Erdington, Birmingham, England.

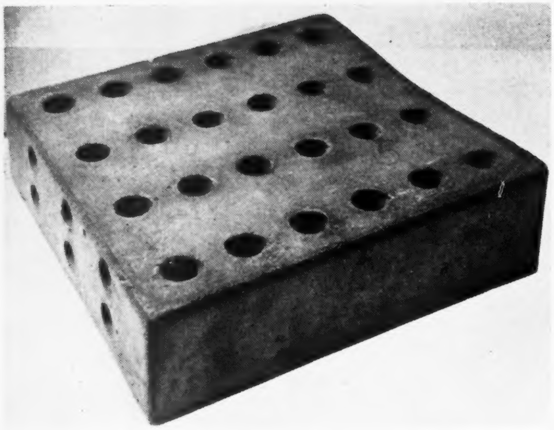


Fig. 2. Early Latex Foam Sponge

a slight rise in the content of water soluble constituents; but these can be dealt with in the usual way.

It has been found, for example, that in many latex processes, if difficulties arise from an undesirable increase in the amount of serum constituents, they can be dealt with readily by a subsequent creaming purification. This largely operates by reducing the number of active ions capable of taking zinc oxide into solution. The proper control of zinc ion activity is of great importance in many latex processes. Not only is it one of the chief factors conditioning thickening of mixings, but it also largely influences gelling and coagulating behavior. A measure of the thickening with zinc oxide under controlled conditions is used as a guide to the coagulating properties of a latex and is of particular significance in latex thread extrusion. Details of the test conditions have already been described.[3] The Z.O.T. (or zinc oxide thickening) number bears a direct relation to the content of water soluble constituents and may be adjusted by controlling the amount of these substances by centrifuging or creaming purification. If a quantity of recreamed or recentrifuged latex is made available, the processing properties of many latices can be effectively controlled by judicious balancing with such purified latex, and this step was taken in the processing of some of the stored latex.

The Z.O.T. number was also used in evaluating natural latices of various types and conditions of preservation. The much lower Z.O.T. numbers associated with sodium pentachlorphenate preserved latex were quite in keeping with its known processing properties and with the low content of water soluble acids found in the aqueous phase.[4]

In selecting one or two latex processes for more detailed examination consideration is not given to the wide range of normal dipping processes. This is not because dipping processes are unimportant, but because so much has been written about them that their novelties are more closely associated with questions of technique which are generally familiar.

The only exception relates to a dipping process[5] which was developed during the war and which is now well established in manufacture, chiefly for articles such as meteorological balloons. The feature of the process is that the former has a small hole in its base so that after a relatively thick coagulum has been built up by dipping, this is expanded and thinned down by inflation with compressed air. The balloon is now cured in the normal way; consequently a much larger product is obtained for a much smaller former than would previously have been possible.

The two chief latex processes which are surveyed in some detail are the latex foam process and a process developed from it in England during the war.

The Latex Foam Process

The latex foam process had been established in Great Britain several years before the war, and it will be of increased importance in the years to come on both sides of the Atlantic. It depends on two main features: (a) that a mechanically produced foam can be made to form and persist in the presence of a surprising concentration of active ingredients, and (b) that the rubber phase can be made to coalesce in predetermined conditions of time and temperature without the collapse of the dispersed air or gas system.

The inventors of the process probably did not fully realize in the early days the complexity of the colloid phenomena they were handling, and it is probably true to say that even today, some 18 years after the initial experiments, comparatively little is known of the intrinsic colloidal changes that take place in the composite latex/air system during the sharp inversion of phase.

Much of the know-how is still empirical, and to those engaged upon or contemplating a field of colloidal research, a study of this important mechanism is most strongly recommended. So much is bound up with the short-term phenomena that occur during the moments of gelling. Factors worthy of further study are the reasons underlying the type and fineness of structure caused by different foaming and gelling agents; factors affecting the collapse of the froth on gelling and the collapse of a set foam on heating; conditions governing gel coalescence, gas evolution and gel syneresis; and the influence of the majority of the foregoing on the size of the product after drying and curing and on its tear strength and hardness.

The discovery of the latex foam process took place not by accident, but, as so often happens, at a time when several lines of development converged to make its realization possible. It may be likened to the parts of a jigsaw puzzle fitting into place when the key piece is found, or the precipitation of the solute content when a crystal is dropped into a super-saturated salt solution.

In 1928 a considerable amount of work had been done on heat sensitization and gelling processes for unfoamed latices. Some work had been going on on the production of indifferent sponges from latex by inflation processes, but the intuitive observation of the persistence of a soap foam during the formation of latex/gas black crumbs made in a cake mixing machine of the conventional type led at the end of that year immediately to the trial of the elementary foaming and setting processes for latex as we know them today.[6]

Figure 1 shows the original small cake mixing machine with which the initial experiments were first carried out, and Fig 2 shows a view of one of the earliest latex foam products made. This product was produced prior to the development of the well-known cushions of the vertical cavitied type. The cavities seen in the picture formed by hollow tubes in the mold were directed toward uniform heat transfer rather than to contributing to the cushion comfort. Work on the drying out of dense foams had also been carried out in the U.S.A.[7]

[3] E. A. Murphy, "Testing and Control of Latex Supplies," p. 151, "Proceedings of the Rubber Technology Conference." W. Heffer & Sons, Ltd., Cambridge, England. 1938.
[4] Baker, *Trans. Inst. Rubber Ind.*, XVIII, 115 (1942).
[5] British patent No. 547,738; Canadian patent No. 432,839.
[6] British patents Nos. 332,525-526.
[7] United States patent No. 1,777,945.

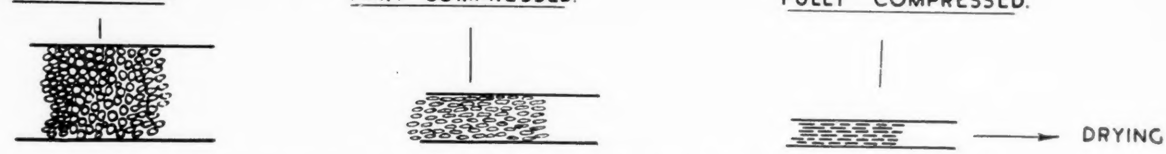


Fig. 3. Sketch Showing How Internal Structure of High Tear Sheeting Persists during Processing

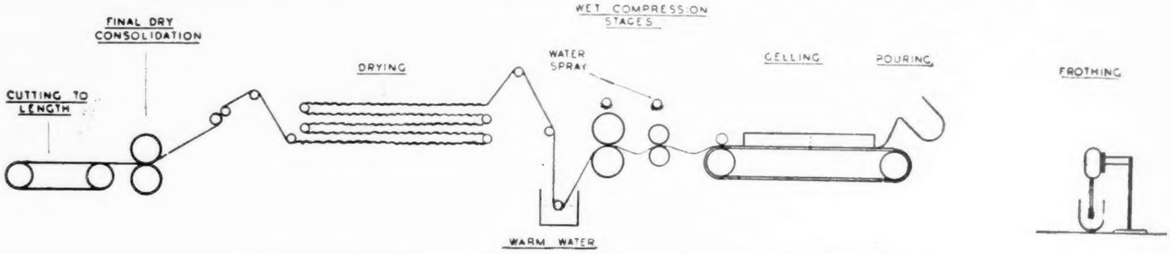


Fig. 4. Flow Sheet (Right to Left) of Continuous Process for High Tear Sheeting

From these early experiments has grown the large latex foam industry that is now rapidly expanding on more than one continent. Unfortunately, during the war, owing ot the exigencies of supply, forward development on latex foaming processes was greatly restricted, but today work is now once more proceeding.

On the process side research has been continuously directed toward improving coagulation control and toward minimizing all forms of scrap. Much work has already been done on continuous frothing methods and apparatus, and patents on this subject have been taken out on both sides of the Atlantic.[8]

Compounding studies on the rubber itself have aimed at improving the load carrying capacity of the sponge so that maximum comfort and support can be given for a minimum cost and weight. In this connection the use of cheapeners [extenders] that are also softeners is not always to be desired. Continuous study of new accelerators and accelerator combinations is of value from the point of view of modifying the relative hardness of the product.

In England relatively little has been done with synthetic latices, although good products have been produced from neoprene latex and experimentally from certain of the GR-S concentrates and from admixtures of both with natural latex. The experience of latex foam processes utilizing synthetic latices has, however, been much more complete in the U.S.A. and Canada.

In the early part of the war high lamp-black loadings and a percentage of an artificial rubber dispersion were used to alleviate the latex shortage.

There is also considerable interest in the developments now taking place on the application of H.F. heating methods to coagulation, vulcanization, and drying of latex foam, as this provides a further method of controlling the process. It is worth while recording that some experiments on the H.F. method, as applied to latex processes, had already been carried out in England as early as 1936.[9]

As a corollary to the latex foam process, a considerable production was made of a latex underlay whose raw material was disintegrated cured scrap from the latex foam process bound by new mixing.[10] The wetted sponge crumb was distributed on a hessian backing, dried, compressed, and cured in long rolls, and so provided a serviceable underlay of long life, chiefly for carpets. It was also built up into special constructions and covered with stout leno fabrics for gymnasium mats and the like. When supplies of cured scrap were short, the sponge crumb was swollen with oil, and as the material was used on a volume basis, saving in rubber was thereby effected.

Latex High Tear Sheeting

Having referred to the latex foam process in some detail, reference is now briefly made to a process that derived directly from it: namely, the latex process for the production of high tear sheeting. This was used during the war in certain constructions of self-sealing coverings for aircraft fuel tanks. Because of its high tear resistance, it can be sewn and used in special suit constructions, for protective clothing, sandblast curtains, chute linings, etc. The figures in Table 1 give some idea of the tear strength of the material in comparison with rubber sheet produced by other methods.

TABLE 1. RELATIVE TEAR STRENGTHS

	Thickness Mm.	Tear/Inch
Latex high tear sheet	2.2	230-260 lb.
	1.0	270-320 lb.
Calendered sheet (high rubber)	0.8	30-38 lb. Down grain.
	0.8	45-50 lb. Across.
Evaporated latex sheet (hot air cured)	1.0-1-5	60-90 lb. Both ways.
Black and red tube rubbers (natural rubber)	1.3-2.5	30-40 lb.

The process depends on heat gelling a specially compounded latex foam, compressing and washing the uncured sheet in stages, drying continuously and stoving [heating] intermittently.[11]

It is well known that rubber is difficult to tear before a cut is started, but subsequently tears with ease. The high tear resisting properties of this rubber are due to the persistence even after full consolidation of the lamellae in the structure that originated in the foam.

Figure 3 shows diagrammatically the way in which the internal structure persists during progressive consolidation. Figure 4 shows diagrammatically the stages of the continuous process; while Figures 5, 6, and 7 present some views of the plant that was employed in carrying out the continuous process.

Tests for Latex Evaluation

Before referring to some thoughts and experiences

[8] British patents Nos. 471,899, 541,289, 572,166; Canadian patent No. 380,-039; U. S. patents Nos. 2,114,275, 2,307,082.
[9] British patent No. 477,911; Canadian patent No. 375,800.
[10] British patents Nos. 399,940 413,284, 414,814; Canadian patents Nos. 349,933, 355,485-486; U. S. patent No. 1,986,404.
[11] British patent No. 536,756; Canadian patent No. 424,226; U. S. patent No. 2,336,944.

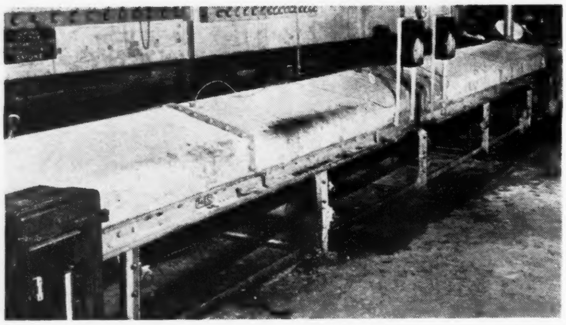


Fig. 5. High Tear Sheeting—Gelling

regarding synthetic and artificial latices, it is worth while to consider the question of standardization of tests for latex evaluation, particularly from the point of view of its behavior in dipping and gelling processes. The characteristics required for other processes, such as, for example, coating and impregnating, are not so controversial and are more directly specified.

There is no doubt that particularly at present there is a definite need of such tests, and undoubtedly considerable work is going on in this direction in Canada and the U.S.A.

Reference has been made to the use of the Z.O.T. number in regard to natural latex, but the use of this measurement and other measurements such as KOH number, depending on the chemical constitution of the serum, whilst useful with natural latex of any one type, would have little meaning for evaluating synthetic and artificial latices of various types and compositions.

Much discussion has taken place from time to time in the literature on the value of frictional or stirring-type stability tests in the presence or absence of sensitizing agents. Whilst such tests may rightly decribe a latex in regard to its behavior in mechanical handling, experience has shown that they are not sensitive to changes in constitution which so strongly affect processing behavior.

It is therefore suggested that for dipping and gelling processes synthetic and artificial latices should be evaluated in the following ways:

For dipping, a standard mixing should first of all be made containing sulphur, zinc oxide, and accelerator, preferably zinc diethyl dithiocarbamate. A simple dipping procedure should then be carried out using each of four coagulants on the former in successive trials. Such coagulants should be a 45% aqueous solution of acetic acid, a 10% solution of formic acid in alcohol, a calcium chloride, methyl alcohol, water solution and a calcium nitrate/chloride alcohol acetone solution. Observation of the firmness and regularity of the deposit should be made immediately after dipping and of the dried and cured deposit in relation to "shortness" and resistance to hand tear.

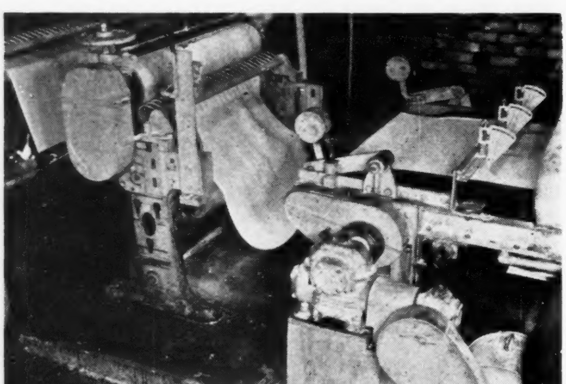


Fig. 6. High Tear Sheeting—Wet Compression

As regards gelling, it is suggested that the gelling agents employed should be sodium silicofluoride in the form of a 20% dispersion dispersed with bentonite clay and a 10% solution of ammonium sulphate rendered alkaline to bromothymol blue with ammonium hydroxide. Each should be used in conjunction with zinc oxide dispersion, and this time the uncompounded latex should be tested.

Preliminary trials should be made with each gelling agent to determine the quantity necessary to cause gelling to take place in 10—15 minutes at room temperature. If clot formation occurs on standing, or if gelling is absent even on increasing the gelling agent appreciably, the preliminary trial should be repeated at 75° C.

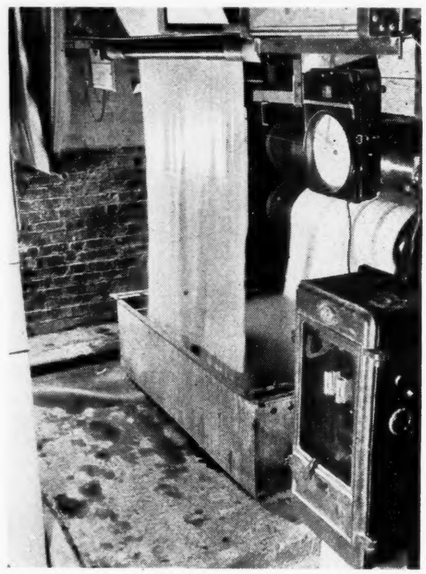


Fig. 7. High Tear Sheeting—Washing Compressed Wet Sheet

Guided by the preliminary tests a mixture is now made up to gel in 10—15 minutes and is poured into a standard strip mold. When gelling has occurred, the syneresis and amount of shrinkage from the mold are noted, and examination is made of sharpness of molding, gel extensibility, elasticity, hardness, and strength.

These suggestions cannot be taken as detailed specifications, but may serve to indicate lines that should be followed in the first examination of new latices. This has been the practice in the preliminary examination of new latices in England. These latices have largely come from the U.S.A., although certain interesting examples from Germany have also been examined.

Emulsions of Synthetic Polymers

The latices of other polymers, such as polyvinyl chloride, polyvinyl acetate, polythene, etc. are now also undergoing development and show considerable promise. Some of these, of course, have specialized uses such as first coat spreading, in adhesives, coatings, and in hydraulic cement compositions.

Whilst in many ways these developments are not on so large a scale as in the U.S.A. and Canada, the fundamental qualities of these materials are well understood, and their development will be pursued.

Two interesting latices of polymeric elastomers were produced in 1943 from polymeric ethylene tetrasulfide and formal polysulfide. These were made in concentrated form, and both gave good film forming properties and coagulation of the natural latex type. These properties enabled a process for their continuous coagulation to be worked out.[12] They were largely the result of the stabilizers and the method of manufacture employed. The concentrated latex of the ethylene tetrasulfide polymer did not have good storing properties but the latex from the formal polysulfide gave no trouble in storage.

When the crisis came in 1941, increased attention was given to the use of existing raw materials in anticipation of the total cessation of latex supplies. The story of the miracle of the large-scale production of synthetic rubber and of synthetic rubber latex in the U.S.A. is, of course, well known. In England attention was turned to the production of artificial dispersions from the available raw materials.

Artificial Dispersions

At first artificial dispersions were chiefly of rubber and reclaim, but the availability of the former soon became vanishingly small. For a time an appreciable quantity of smoked sheet was dispersed, and various forms of resinous bodies and wild rubbers were used in redispersed form as latex extenders. A little later a much greater gallonage of red tube and whole cover reclaim was made, and the use of these materials is, for the time being at any rate, still persisting.

One of the most important points about the artificial dispersions being made today is that they compare in fineness and uniformity of particle size with natural latex, The average particle size of red tube and whole cover reclaim dispersion is 1-2μ, and an average solids content of 50% is usually supplied. These dispersions form flexible rubbery films on drying out. In the production of reclaim dispersions so much depends on the nature of the reclaim itself and the type and amount of plasticizer used in the redispersion process. It is important that the original raw material be specially refined and free from less reclaimed bits or "nibs." Many attempts were made to produce high-grade reclaim dispersions from thermal reclaim, but these were never so completely satisfactory as those made from alkali reclaims. Not only was the particle size inferior owing to the intrinsic non-homogeneity of the raw material, but in general the final dispersion obtained was less stable.

The dispersion processes used for reclaims and various plasticized resinous bodies were also extended to GR-S, plasticized polyvinyl acetate, polyvinyl acetal, and similar materials. The processes in question all relate to direct high concentration inversion, not the dispersion of a solution of the material.

Certain experiences in the production of GR-S dispersion may be of interest to those who are so familiar with the characteristics of this material. The usual experience in the inversion process for heavy plastics is that the early stages are concerned with the incorporation of colloid and distension with water under conditions that a fine dispersion of the water in the plastic is obtained. Then, chiefly by a temperature change and further water additions, inversion of phase takes place, and an aqueous paste is formed which is diluted normally.

In the case of GR-S, however, after the addition of colloid and some water, a fine crumb was first formed which, on further water additions, spontaneously disintegrated to a smooth paste which could be diluted at will. The impression gained was that the boundaries of fission were largely associated with the boundaries of the original GR-S particles. This was the experience with the earlier shipments which were less readily processed than material available today.

Apart from their use in tire cord dopes, artificial dispersions of various types have been or are being used for natural latex extension, for adhesives, primers, felt impregnants, as spread coats, and in latex/hydraulic cement compositions for weather decking and special floors. In fact the advantages to be gained from the use of some of the newer artificial dispersions of certain plastics and synthetic resins suggest that for certain special uses natural latex may have been superseded.

Summary and Conclusions

Although casting techniques for non-foamed products have not been mentioned, these were by no means neglected, and much was done in recent years in England with the processes of the Kaysam type. New gelling or casting methods are always of technical interest, and the recent descriptions of hot gelling by polyvinyl ethers which are soluble in the cold, but reversibly insoluble when hot[13] are worthy of further investigation. Strong gels have been obtained by this method with natural and synthetic latices.

The whole field of latex production and manufacture is one of considerable complexity, but equal fascination. New developments in auxiliary colloids, stabilizers, dispersants, foaming and anti-foaming agents, and other surface active materials, all play a part in extending the use of aqueous dispersions. In England the range of surface active agents does not compare in diversity with that available in the United States and Canada but special types have been developed and selected for special purposes. These include a wetting agent for addition to formalin to prevent local coagulation when it is added to latex mixings for ammonia neutralization, and others that give persistent high wetting properties in the presence of active formaldehyde-phenol concentrations.

As far as the future is concerned, what can be hoped for is a whole range of raw materials, natural and modified natural latices, emulsion polymers and artificial dispersions, each of them finding its proper place on economic, logistic, and technical grounds. To these will be added new techniques, some of which will benefit from the huge developments made in other fields during the war.

What is required is a maximum uniformity in raw materials, improved control of processes, and, above all, a greater understanding of the fundamentals involved, which in its turn awaits the tardy, but now considerably accelerating development of colloid science.

Acknowledgement is made to the directors of the Dunlop Rubber Co. Ltd. for permission to publish this paper.

[12] British patent No. 572,030.
[13] R. de Lattre, "*La Journee du Latex,*" p. 12. *Revue Générale du Caoutchouc,* Paris, France. 1944.

"Taber Thermofold for Folding Sheet Plastics." Taber Instrument Corp., North Tonawanda, N. Y. 6 pages. Specially prepared for management and production executives, this bulletin reviews the performance features of the company's new sheet plastic folding machine and contains instructions for operation and adjustment of the machine together with engineering specifications.

Improvements in Gas Mask Faceblanks—I[1]

S. H. Katz[2] and Irving Pockel[3]

THIS paper reviews progress in the art of making Tissot-type faceblanks for U.S. Army gas masks. The faceblank is the major component of the gas mask facepiece and the foundation for the assembly. More skill has been required in developing and producing faceblanks to fit large numbers of soldiers with their varieties of facial outlines, contours, and sizes than that required for lenses, eyerings, outlet valves, or other facepiece components. Faceblanks serve their purpose only when assembled with other components into gas mask facepieces; so, although this paper deals primarily with the faceblanks, they are frequently considered with their assemblies, and the illustrations show faceblanks as they appear in gas mask facepieces.

Facepieces are designed on the principle that a wearer's head is spherical with a chin appendage, and a facepiece to fit the face is essentially conical with a pocket for the chin. The evolution of the fully molded faceblank is reviewed. Owing to insufficient mold-making skill, faceblanks intended to be in three sizes actually fell into five sizes. In further development, three sizes, small, universal, and large, are being made, because three sizes are sufficient, and because of the complexities in manufacture, storage, issue, and use of five sizes. The earlier system of defining faceblanks utilized mechanical drawings of the faceblank itself. A system recently adopted details the core of a mold or a pattern on which the faceblank fits precisely. The latter system facilitates the making of accurate molds for faceblanks. The trend in U.S. Army service gas masks has been toward smaller assemblies, progressively lighter in weight. Further reduction in bulk and weight appears to depend on eliminating the canister by making a faceblank or hood of permeable materials which will serve as a filtering element to restrain gases and smokes.

Natural rubber compounds have been most nearly ideal among the materials employed for making faceblanks, although some synthetics, particularly Butyl rubber (GR-I), are more resistant to penetration by some chemical warfare agents. After shortages caused by the war reduced the supply of natural rubber to use solely in manufacture of inlet and outlet valves for army gas masks, reclaim rubber and synthetics were employed, but only neoprene faceblanks were made in quantity for the U.S. Army. Neoprene (GR-M) suffers from stiffening and hardening at temperatures below freezing. Butyl rubber suitably compounded is softer at low temperatures than neoprene, and recently developed Butyl compounds are about equal, when cold, to natural rubber. Slow curing of Butyl rubber is a major disadvantage. While development of substitutes for natural rubber has received much attention and effort, they are merely mentioned here as this paper deals essentially with other phases of faceblank development. The faceblanks for service or training-type masks are primarily considered, although the same principles apply in faceblanks for diaphragm and for optical type facepieces.

Fig. 1. Service Facepiece M1A2, Assembled from a Flat Faceblank

Fig. 2. Training Facepiece E32R12 and Canister Assembly, Showing a Fully Molded Faceblank

Principle of Fitting Faces

In fitting gas masks facepieces on faces, the cranial and facial form is regarded as a sphere with a chin appendage; the facepiece is regarded as a cone with a pocket for the chin. The faceblank of the facepiece contacts the face around the entire periphery, not necessarily at the edge of the faceblank because the contact may be inside and away from the edges. In the case of a true sphere and cone, both rigid, a line of contact would occur when they are brought together; but a face has soft flesh, and a faceblank is flexible and elastic; so the contact may widen into a band. It is necessary only that the contact between a face and a facepiece be continuous around the entire face in order that peripheral leakage shall not occur.

These principles apply in fitting facepieces fabricated from flat faceblanks, and also for fitting those from full molded faceblanks, both of which are considered hereafter.

Many foreign faceblanks, as exemplified in German army facepieces, are based on a different principle of face fitting. These facepieces are built on a face frame or foundation comprising two bands, one surrounding the head from the chin-neck position along the cheeks and temples and over the crown; the other surrounding the forehead, temples, and back of the head. The bands are joined at the temple positions. The parts in front of and below the temples are non-elastic and comprise the main structure of the frame; those above and behind the temples include elastic members comprising parts of the head harness of the finished facepiece. The body of the facepiece is stitched and sealed at the outer periphery of the face frame.

British Commonwealth, Italian, Russian, and late French and Japanese faceblanks employ fitting principles like those of U.S. Army masks. Czech, Chinese, and early French faceblanks are fitted like the German ones.

The U.S. Army facepieces can be pressed into the hollows at the temple or cheek positions of some faces by

[1] Released for publication by the War Department. Contribution of C.W.S. Technical Command, Edgewood Arsenal, Md.

[2] Senior consultant.

[3] Chief, Defense Materiel Branch, Office of Chief, C.W.S. Present address, Cambridge Industries Co., Cambridge, Mass.

Fig. 3. Lightweight Service Gas Mask M3-10A1-6 with a Fully Molded Faceblank in a Service Facepiece, M3

arrangements of the head harness buckle.[4] This advantage is lacking in the type of facepiece built on a face frame.

A hooded type of facepiece used abroad has an elastic hood integral with the faceblank and covering the top, sides, and back of the wearer's head. Some Russian, Italian, and German masks employed hood-type faceblanks.

Flat Faceblanks

Flat faceblanks were simple in form and easily manufactured because they involved no special molding difficulties. This type was used in the earlier U.S. Army service facepieces and others. The faceblanks were stockinet covered on the side forming the outer surface of the finished facepiece, shown in Figure 1. The peripheral shape as molded was trapezoidal; thickness was uniform. Patches of fabric were vulcanized in place to back the stitching for attaching head harness tabs. Faceblanks with correct peripheral shape to yield the facepiece were died from the trapezoidal blanks. Two edges of a blank were stitched together to form a "chin seam," which was then cemented and covered with bias tape. The stitched and taped faceblank required addition of an angletube, eyepieces, deflectors to discharge incoming air over the eyepieces, and head harness tabs, to complete a facepiece.

The rubber industry had no difficulty in producing molds or in manufacturing the simple form of flat faceblanks. Assembly into facepieces, however, was more difficult and laborious than assembly from fully molded faceblanks.

Fully Molded Faceblanks

Fully molded faceblanks[5] were developed in order to bring the lenses of the eyepieces closer to a gas mask wearer's eyes than those in facepieces built from flat faceblanks; to enlarge the field of vision through the facepiece; to reduce dead space; to provide a facepiece conforming more nearly to the shape of a wearer's face than do facepieces from flat faceblanks; provide more comfort for the wearer; eliminate the vulnerable chin seam; reduce the number of parts and the work of assembly by eliminating the angletube, separate deflectors, and multiple metal parts in the eyepiece assembly; simplify the attaching of head harness chapes by riveting instead of stitching; and reduce the cost of finished facepieces. Fully molded faceblanks have been as complex in shape and structure as any one-piece item required of the rubber industry. Much more difficulty is incurred in producing the molds for the fully molded than for flat faceblanks; dimensional tolerances have been more difficult for the mold manufacturers to attain; but acceptable molds are made, and precision is increasing with experience. Molds have been made of aluminum, steel, and bronze plated with chromium on the internal surfaces. Aluminum was unsatisfactory because of gradual dimensional changes under the necessary molding pressures.

Faceblank for Training Facepiece E32R35

The faceblank for the service and training facepiece E32R35 culminated the first series in the development of fully molded faceblanks. Figure 2 shows the faceblank built into a training gas mask. The outlet valve stem of the faceblank extended beneath the bulbular nose portion. A stem for attaching a canister (or a hose) joined below the chin with the deflector tubes made integral with the faceblank. An annular groove molded in the faceblank received each lens in the eye piece assemblies, and a metal ring with lugs was crimped around the groove. The groove and its walls, together with the adjacent body of the faceblank, were S-shaped in cross-section. An object in designing this faceblank had been to hold lenses, identical in shape with those employed in airplane pilot's goggles, in the same position relative to a wearer's eyes as that of lenses in goggles worn over the eyes. Pads on the outer side made by thickening the faceblanks were molded at positions for riveting the head harness tabs. At the two forehead positions the pads were on tabs molded to extend outside the edge of the faceblank; at the temple and cheek positions the pads were molded well inside the periphery. Integral loops at the temple and cheek positions were provided at the edge of the faceblank to hold the tabs in their respective alinements after assembly.

Several thousand of the faceblanks were molded commercially and service tested in the training gas mask. The results were generally favorable, and the testing agencies made no recommendations pertaining to the principles incorporated in the fully molded faceblank, although recommendations included increasing the field of downward vision and addition of a smaller size of facepiece to the single size tested.

Faceblank for Facepiece M3

Downward vision was increased for wearers of faceblanks subsequently developed. Illustrative of the later faceblanks is the one employed in the service facepiece M3 shown in Figure 3. Improvements incorporated in this facepiece are mentioned below.

Symmetrical Sockets for Lenses

Each lens of a pair of aviator's goggle-shaped lenses was a mirror image of the other, but a single lens was unsymmetrical, necessitating molding them in both right and left forms. The grooves in the eyepiece portions of the faceblanks were shaped accordingly. These lenses were replaced by symmetrical, cylindrically curved lenses, long in the vertical dimensions so as to increase

[4] "Fitting of Mask, Gas, Service, Lightweight M3-10A1-6, and Mask, Gas, Service, Combat, M5-11-7." War Department Technical Bulletin TB3-205-8, Jan. 3, 1945.

[5] Fully Molded Gas Mask Facepiece. S. H. Katz and D. O. Burger, U. S. patent No. 2,164,330, July 4, 1939.

the downward vision, approximately triangular with rounded corners, and the eyepiece apertures in the faceblank were shaped to correspond. However the groove was eliminated. Instead the faceblanks have subsequently been made with shallow sockets for the lenses. The outer portions of the sockets are flanged inwardly with a narrow border.[6] When a lens is inserted into a socket and an eyering is crimped around the assembly, the walls of the socket are pressed inwardly under the lens. Although rapid deterioration of the rubber of the sockets, due to distortion caused by the crimped eyerings was feared, no deterioration of importance has been found in accelerated aging tests or during storage or use of the gas masks.

Elimination of grooves for fixing lenses in faceblanks simplified the construction of faceblank molds by reducing the number of parts per mold, reduced the labor required for molding and simplified the process.

Outlet Valve Stem

The stem for attaching outlet valves was changed from the vertical position beneath the nose portion to a horizontal position in front of the wearer's mouth. The cross-sectional shape was simultaneously changed from elliptical to circular. This change again simplified mold construction and enabled use of improved outlet valves with round stems.

Stippled Inner Surfaces

Fully molded faceblanks were first made with smooth inner surfaces. It was found in service that the face pieces were prone to slip and change position on the wearers' faces, especially when wet with perspiration. Annoyance and sometimes leakage attended the slipping. It was overcome by providing a stippled band on the inner surface from the periphery inward to a width of about two inches.

Narrow Faceblank

Faceblanks were fully molded at first with a broad oval periphery like a person's face. The molds required were massive and bulky; transfer of heat in the vulcanization presses was sluggish, reducing output as well as requiring heavy work to operate the molds. Heat transfer was improved and labor was reduced when the shape of the faceblank was changed to a flatter form by bringing the sides closer together. A vertical section near the edges thus takes a narrow oval shape or may even be shaped somewhat like a dumbbell. The forehead portion at the center line is pushed forward to retain the circumferential dimension at and near the periphery. The forhead part draws backward when the sides are parted to fit on to a face. The narrow faceblank assembled into a gas mask fits into a narrow carrier with little or no distortion; whereas faceblanks molded in the broad open shape were distorted when put in these carriers.

Chin-Mounted Canisters

The fully molded faceblanks first submitted for service tests were made into training gas masks with the canisters directly connected to the stem under the chin. Figure 2. As the faceblanks can be used interchangeably with service mask assemblies having a hose between the canister and the facepiece, more of them have been used in making the service gas masks, employed heretofore in greatest numbers. Recently a less cumbersome mask than the service mask was demanded by combat troops. The canister was returned to the chin position on a faceblank identical with the one employed in the service facepiece M3. This mask, standardized as the Mask, Gas, Service, Snout-Type, M8-11-10, is shown in Figure 4 and illustrates the versatility of the fully molded service faceblanks.

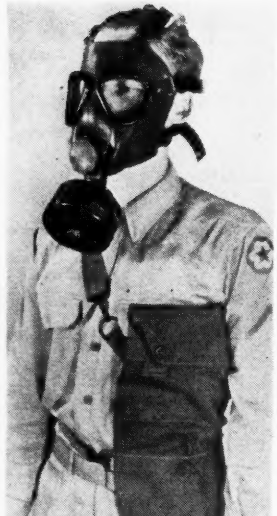


Fig. 4. Snout-Type Combat Service Gas Mask M8-11-10.

Fig. 5. Combat Service Gas Mask E19R46-M11-7

Faceblank for Combat Service Facepiece E19R46

This faceblank, shown in Figure 5, is the latest developed in the series of service gas masks. Two especial features are included: first, an integral stem on either the left or the right cheek for attaching a mounting piece to hold a screw-on combat canister; and, second, the absence of a hose attachment stem at the chin.

The space within the cheek stem communicates with the channel in the deflector tube. The deflector tube passes just under the nose and discharges air on to each eyepiece assembly. The appearance suggested the name "mustache facepiece" for the assembly.

Earlier faceblanks for combat masks were made by modifying molds for faceblanks of service masks in order to provide the cheek stem for canister attachment, and by eliminating the hose stem under the chin. A hole was left at the chin position by the metal cores required for molding the channels in the deflector tubes. This hole was sealed with a patch vulcanized in another operation after molding the faceblank. The mustache-type faceblank takes a core for deflector tubes, which can be extracted without leaving a superfluous hole. No patching operations are required.

The faceblank for the combat gas mask permits assembly of the most compact gas mask that has been developed with a canister for purifying air. The British were first to develop a combat-type gas mask.

Faceblanks Cast from Latex

Faceblanks have been manufactured by casting latex in molds.[7] The latex is compounded with accelerators for vulcanization, antioxidants, sunproofing agents, pig-

[6] Fully Molded Gas Mask Facepiece. J. F. Battley, D. O. Burger and R. Monro, U. S. patent No. 2,359,506, Oct. 3, 1944.
[7] R. J. Noble, "Latex in Industry," Chapter XV, "Molding (Casting)." *Rubber Age*, New York, 1936.
D. R. Cutler, "Kaysam, A Casting Process for the Manufacture of Rubber Products from Latex." INDIA RUBBER WORLD, Oct. 1, 1936, pp. 35-59.

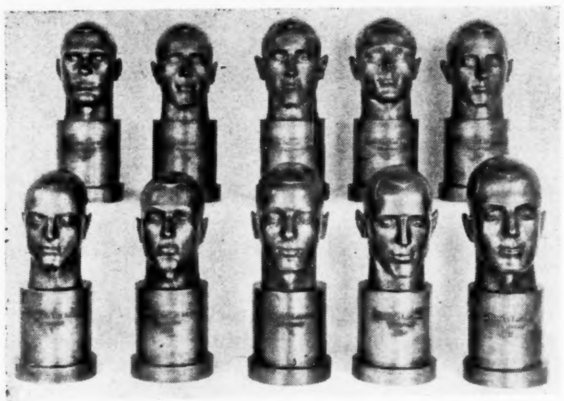


Fig. 6. Ten Dissimilar Heads of Cast Bronze Representing Varieties among Soldiers of the U. S. Army

Front Row, Left to Right: 1. Small; 2. Intermediate between Small and Universal; 3. Universal, Head with Average Dimensions; 4. Intermediate between Universal and Large; 5. Large

Rear, Left to Right: 6. Universal with Short Facial Length; 7. Universal with Long Narrow Face; 8. Universal with Deep (Front to Rear) and Long Face; 9. Universal with Broad Face; 10. Universal with Broad and Deep Face

ments, sulfur, and salts to cause coagulation when the colloidal mixture is heated moderately. After casting, the mold and its contents are both heated to effect the coagulation in the required form. The coagulated latex faceblank is removed from the mold, soaked and washed thoroughly to remove salts, and finally vulcanized on a form in an oven or hot chamber. Initial accelerated aging and other physical test requirements were met satisfactorily; the tensile strength was exceptional, ranging up to 6,000 psi.

However the faceblanks proved very unsatisfactory. A large shrinkage occurred in the process; dimensions and thicknesses specified were difficult to attain, resulting in acceptance of only 62% of the output. Difficulties in assembly of facepieces due to dimensional irregularities in the acceptable faceblanks were excessive. Notwithstanding the acceptable results of accelerated aging tests, deterioration with natural aging was rapid. A faceblank became entirely unserviceable in 18 months' outdoor exposure, whereas a sample faceblank molded with heat and pressure by the conventional process showed no visible deterioration in a concurrent exposure. Deterioration in storage was rapid also.

Because of the unsatisfactory experience with the faceblanks made by casting latex, none produced by this process were procured subsequently.

Sizes of Faceblanks

Flat Faceblanks

Service facepieces M1A1 formed from flat faceblanks are made in five sizes numbered from 1, smallest, to 5, largest. No particular difficulty was incurred in making the simple forms of molds, and the cutting dies required to produce the five sizes of facepieces. Notwithstanding the simplicity compared to production of fully molded faceblanks, problems of manufacture, stock records, and issuing of gas masks with a multiplicity of sizes led to developing a service facepiece M1A2 in "universal" size intended to fit the faces of all Army personnel.[8] After standardizing and extensive experience in issue and use of the universal-size service facepiece M1A2 it was found that about 95% of the faces were suitably fitted, but 4% of facepieces in a small size 1 and 1% in the large size 5 were needed. They were supplied thereafter by providing limited numbers of the size 1 and size 5 service facepieces M1A1.

Fully Molded Faceblanks

When fully molded service and training facepieces were being developed, a single size to fit all soldiers was again sought. Because the fully molded faceblank is shaped to conform more nearly to the shape of faces than the flat faceblank with a stitched chin seam, it was hoped that the one size would accomplish the desired result;[9] but it was not attained. A small size and a large size were then developed.

When a facepiece is fitted on a small face, the bottoms of the eyepieces should not be higher than one inch below the level of the pupils of the wearer's eyes, and on a large face the tops of the eyepieces should not be lower than ½-inch above the level of the pupils.[10] This conformation is needed for visual angularity, and on most faces the universal size fits correctly. But some faces required larger or smaller sizes because of partial obstruction to the field of vision even though a universal-size facepiece fitted without leakage.

Deviations from Exact Universal Size

Drawings of faceblanks were made to provide explicit dimensions with small tolerances, and plaster patterns on which the faceblanks should fit were supplied to mold manufacturers. Notwithstanding these aids, the deviations in faceblanks from specified dimensions were much more than anticipated. The art and the skill of the mold makers were insufficient for the precision sought. It became necessary to permit increase in the dimensional tolerances stipulated on the faceblank drawings in order to attain production. The greater tolerances, termed "manufacturing tolerances," were necessary although contracts for molds were made on the basis of tolerances stipulated on the drawings.

The considerable deviations from exact universal size were emphasized when medical officers requested additional gas masks with faceblanks which they described as "small featured." These were nominally universal-size faceblanks and were wanted in addition to masks with true universal-size face-blanks. The small featured masks were found helpful to optometrists in arranging both gas mask eyeglasses and facepieces to fit soldiers requiring visual corrections in addition to protection from gases.

Complaints received about discomfort from gas masks with faceblanks from several particular molds were found on investigation to be untenable, but it was decided to classify the faceblanks made in existing molds in five sizes instead of the nominal three sizes and to designate the respective sizes as small, small universal, univeral, large universal, and large.

Analysis of fitting data obtained from measurements and fitting tests on over 3,000 soldiers showed that the five sizes may be most satisfactorily apportioned according to this division:

Small (S)	5%
Small universal (SU)	19%
Universal (U)	62%
Large universal (LU)	11%
Large (L)	3%

(*Continued on page* 813)

[8] Universal Facepieces for Gas Masks. O. I. Gaines, U. S. patent No. 2,131,730, Oct. 4, 1938.

[9] Respiratory Device. H. M. Dodge and H. T. Kraft, U. S. patent No. 2,300,912, Nov. 3, 1942.

[10] "Fitting of Mask, Gas, Service, Lightweight M3-10A1-6, and Mask, Gas, Service, Combat M5-11-7." War Department Technical Bulletin TB3-205-8, Jan. 3, 1945.

OPB Bibliography Reports on Rubber Products—III[1]

DEUTSCHES Gummi-Regenerierwerk, Wilheim Galomback & Co., Hamburg. W. L. White and R. A. Schatzel. PB 1041. 1945. 4 pages. Photostat $1; microfilm, 50¢. A brief description of the process of reclaiming rubber at this plant which produced 350 tons monthly is given, together with a list of the equipment and details of the method.

Gummiwarenfabrik Hutchinson, Mannheim. W. L. White and R. A. Schatzel. PB 1043. 1945. 5 pages. Photostat $1; microfilm 50¢. This is a report on the manufacture of rubber footwear, belting, and some molded goods. Both transmission and conveyer belts are of folded construction; cotton duck was formerly used, but during the war the use of spun rayon with no treatment was necessary. Formulae are given for belt friction and skim and cover compounds. The company also has a small reclaiming department to manufacture reclaim for its own needs.

N. Y. Hamburger Gummi-Compagnie, Harburg. W. L. White and R. A. Schatzel. PB 1042. 1945. 5 pages. Photostat $1; microfilm 50¢. A description of the equipment and methods used in producing rubber-lined steel tanks at this plant, one of the largest manufacturers of such tanks, is contained in this report. This company also produced some molded hard rubber articles. Formulae for the various types of coverings are listed.

Rheinische Gummi Celluloid A.G., Mannheim. Mechanical Rubber Goods. W. L. White and R. A. Schatzel. PB 1044. 1945. 5 pages. Photostat $1; microfilm 50¢. The report of a trip to a plant making molded and extruded rubber goods for military purposes, with or without metal inserts, is detailed. Metal inserts were coated with chlorinated rubber or chlorinated Buna S (Desmidure) and "Bunalit" for Perbunan. Typical formulae for soft Buna S and Perbunan compounds are included.

The Influence of Load and Inflation on the Selection of Pneumatic Tires for Military Vehicles. Karl F. Eklund. (U. S. Engineer Board Report 922). PB 1662. 1945. 105 pages. Photostat $7; microfilm $1.50. The objective of this analysis is the codification of available data (pertaining to the effect of pneumatic tire size and inflation) on the adverse terrain mobility of military motor vehicles, and the preparation from these data of design criteria which could then be used as a basis for the application of tires to military motor vehicles yet to be designed, to insure that U. S. Army vehicles would have requisite mobility. The tests (made by the Ordnance Department and the Corps of Engineers with the cooperation of U. S. industry) upon which this analysis is based have already resulted in a definite program for the modification of tire equipment on certain present standard vehicles. This report contains photographs, charts, and diagrams.

[1] From "Bibliography of Scientific and Industrial Reports," office of the Publication Board, United States Department of Commerce, Washington, D. C.

Bibliography—Natural and Synthetic Rubber. Mattie L. Houghten. (U. S. Navy Department Research and Standards Branch, Technical Literature Research Series, 36). PB 1753. 1945. 36 pages. Photostat $3; microfilm 50¢. This bibliography was prepared at the request of the Rubber Unit of the Chemistry Section of the Research and Standards Branch. The references are arranged under two subject headings: namely; the statistical procedure of sampling and the physical methods of testing natural and synthetic rubber. The items in the first group are arranged alphabetically by authors. A subject index is attached. The second group is arranged chronologically starting with the present and dating back to 1920. An author and a subject index are attached. References were obtained through search of publications in various government libraries and from engineering bibliographical indices.

Bibliography—Rubber Testing, Preliminary Report. Mattie L. Houghten. (U. S. Navy Department Research and Standards Branch. Technical Literature Research Series, 42) PB 1756. 1945. 42 pages. Photostat $3; microfilm 50¢. An annotated bibliography on rubber aging including bibliographies and general references on light, oxygen, ozone, sunlight, and ultra-violet light aging of rubber, as well as references on antioxidants, and U. S. and foreign synthetic rubber patents are contained in this report together with author and subject indices.

Synthetic Rubber Plant, Schkopau (near Merseberg) MR-D-975152. R. T. Barbers. (Army Air Forces, Technical Intelligence Report, P-25). PB 2016. 1945. 31 pages. Photostat $3; microfilm 50¢. This report presents information obtained on condition and production capacity of this synthetic rubber plant and lists documents evacuated. Appendix 1 lists general subject of cases of documents removed from an underground mine where they had been stored. These cases contain records, reports, and data relating to chemical production and research, and records on administrative and engineering matters. Appendix 2 is the text of a production schedule proposal submitted by the German director, Carl Wulff, to Allied Military Government officials. It includes an inventory of raw and finished materials on hand as well as requirements and sources of supply. Appendix 3 lists the contents of each case of documents.

I. G. Farbenindustrie Synthetic Rubber Plant, Ludwigshafen. Russell Hopkinson and others. PB 1763. 1945. 54 pages. Photostat $4; microfilm $1. This report states that this plant had a rated capacity of 30,000 tons per year of Buna S-3, but this was never attained. Butadiene was produced by Reppe synthesis from formaldehyde and acetylene. Seventeen tons of coal were required per ton of Buna S. Styrene was produced by continuous alkylation of benzene and ethylene to ethylbenzene and dehydrogenation to styrene. Buna S-3 was made by reacting butadiene and styrene in a continuous reactor system and finishing on a paper machine. Total German Buna S capacity was

planned for 170,000 tons per year; production never exceeded 112,000 tons. Koresin, a tackifier made from acetylene and isobutyl phenol, is described. Nylon and nylon-like materials, Igamids A, B, BS, and CA, are also described. Igamid BS, a polyamide from amino-caproic acid, was used for cord for aircraft tires. Considerable information relating to processes, production, and costs are presented. Lists of documents removed, and the documents microfilmed are also given.

Technical Inspection of Robert Bosch Dispersal Point, Wurtembergerische Carttun, Heidenheim S-71. L. P. Kongsted. (Army Air Forces Technical Report P-20). PB 2011. 1945. 4 pages. Photostat $1; microfilm 50¢. This report describes the process of molding hard rubber parts for Robert Bosch aircraft and automotive magnetos at a plant in Heidenheim. Hard rubber parts are molded entirely from synthetic hard rubber Buna S and Buna SS. Buna SS is better than Buna S for parts where mechanical dimensions and shapes must be maintained at elevated temperatures. Buna S is easier to mold and is used, therefore, where permissible. Tests to which hard rubber material is subjected are described: ball indentation under pressure and heat (similar to Brinnell test) and Martens test.

Material Used in Two German One-Man Life Rafts. L. M. Peterson. (U. S. Army Air Forces Engineering Division ENG-M-54-671-137). PB 2988. 1943. 6 pages. Photostat $1; microfilm 50¢. Analysis of materials used in two captured German one-man pneumatic life rafts is given. Rafts were made of mercerized cotton fabric with lamination of rubber (one with synthetic rubber; the other with natural rubber) and with an outside coating of an unidentified yellow plastic. The valves on the two rafts were essentially the same.

Synthetic Rubber Polymerization and Drying. H. A. Schade. PB 1896. 1945. 11 pages. Photostat $1; microfilm 50¢. This report, in German, deals with Buna production at the Chemische Werke Huls, an I. G. Farbenindustrie plant. The method of polymerization of four different types of Buna (S, SR, SS, and S-3) is described in some detail. Mixing formulae and yields are given. Coagulation procedure and drying operations are described in detail, and flow sheets are presented for these operations.

Synthetic Rubber Plant. Buna Werke-Schkopau A. G. J. D. Fennebresque, C. C. Monrad, and J. E. Troyan. PB 512. 1945. 65 pages. Photostat $5; microfilm $1. This plant is the largest Buna S plant in Germany, with a rated capacity of 6,000 tons a month. Production in 1943 was 68,000 tons. Aside from minor bomb damages, this plant is in good operating condition. Acetylene for acetaldehyde and ethylene is made from calcium carbide. Butadiene is made from acetaldehyde by the aldo process, and ethylbenzene for styrene, is made from ethylene and benzene. Buna S and Buna S-3 are made by a continuous polymerization process. This plant was primarily concerned with production, and very little research and development work was carried out. The plant is described in some detail, and many photographs are included. Many documents and files were removed and sent to CIOS Secretariat in London. These include photographs of the plant, ledgers of production, costs, and yields, engineering (maintenance) files, and plant layout drawings. In the appendix, tables listing capacities, production records, production and cost summaries, yield summaries and the above-mentioned photographs appear.

Deutsche Oelfabrik Dr. Grandel, Hamburg. W. H. Goss. PB 3448. 1 page. Photostat $1; microfilm 50¢. A visit to this plant in August, 1945, and an interview with Superintendant Pfahler are reported. The two principal products are brown factice and white factice. The raw materials used are rapeseed oil, mineral oil, and sulfur and sulfur chloride. The principal uses of the factice is for mixing with rubber in the manufacture of hose. The equipment at the plant was still intact, but quite out-of-date.

Oppau Works, I. G. Farben, Oppau, near Ludwigshafen, Germany. J. W. Livingston. PB 4329. Photostat $1; microfilm 50¢. A general description of the Oppanol plant for the manufacture of polyisobutylene is included in this report. At this plant is also an installation for the production of ethylene by dehydration of alcohol. Isobutylene is polymerized in liquid ethylene solution using boron trifluoride as catalyst. Oppanol is used in Germany as a natural rubber substitute.

(To be continued)

Gas Mask Faceblanks

(Continued from page 811)

The five sizes were adopted for faceblanks made in existing molds.

The system involving five sizes has not been continued in developing new faceblanks because the multiplicity of sizes greatly augments the complexities in preparation of drawings, manufacture of additional types of molds, and in the storage of gas masks, issue, and record keeping. Effort was concentrated instead on producing more accurate molds for three sizes of faceblanks, small, universal, and large.

Study of Dimensional Requirements

The study of facial sizes and shapes of over 3,000 soldiers, mentioned above, involved fitting gas masks and taking about 60 anthropological measurements on each face. These measurements were analyzed statistically, and dimensions for use in design of faceblanks in three sizes to produce facepieces to fit most satisfactorily the faces of U. S. Army male personnel were derived. Ten standard heads were cast in bronze with measurements derived from the analysis to represent ten dissimilar groups of faces. These standard heads include three closely corresponding to measurements derived for use in design of the small, universal, and large sizes of faceblanks. The ten bronze heads are pictured in Figure 6. The heads in the lower row, on the left, middle, and right correspond to average heads fitted respectively with small, universal, and large sizes of facepieces.

(To be continued)

Rubber: Natural, Reclaimed, and Synthetic[1]

New Supply, Distribution, and Stocks, 1939-45[2]

TABLE 1. GENERAL SUMMARY, RUBBER: NATURAL, RECLAIMED, AND SYNTHETIC NEW SUPPLY, DISTRIBUTION, AND STOCKS, 1939-45†

(Long Tons)

Item	1939	1940	1941	1942†	1943	1944	1945
New supply, total	687,618	1,030,153	1,311,592‡	591,071	591,109	1,142,138	1,209,761
Domestic prod., total	187,994	211,911	282,585†	307,525	536,072	1,023,367	1,064,218
Natural	....	....	....	....	359	130	536
Reclaimed	186,000	208,971	274,202	285,114	303,991	260,607	243,309
Synthetic	1,994	2,940	8,383‡	22,411	231,722	762,630	820,373
Imports, total	499,624	818,242	1,029,007	283,546	55,037	118,771	145,543
Natural §	499,616	818,242	1,029,007	282,653	54,970	107,704	135,136
Reclaimed	8	‖	....	893	67	24	‖
Synthetic	....	....	....	....	....	11,043	10,407
Distribution, total	789,686‡	860,051‡	1,052,389‡	691,920	834,248	1,087,597	1,143,979
Dom. consumption, total	763,951‡	841,648‡	1,032,490‡	649,240	779,607	961,866	1,040,045
Natural	592,000	648,500	775,000	376,791	317,634	144,113	105,429
Reclaimed	170,000	190,244	251,231	254,820	291,082	251,083	241,036
Synthetic	1,951‡	2,904‡	6,259‡	17,629	170,891	566,670	693,580
Exports, total	25,735	18,403	19,899	42,680	54,641	125,731	103,934
Natural	13,125	7,060	5,376	10,856	20,815	9,665	6,743
Reclaimed	12,610	11,343	13,851	30,405	15,678	11,800	13,413
Synthetic ¶	**	**	672†	1,419	18,148	104,266	83,778
Stocks, end of year, total††	151,050	321,594‡	57,157‡	469,854	233,090	287,514	350,324
Natural	125,800	288,864	527,708	422,714	139,594	93,650	118,715
Reclaimed	25,250	32,630	41,750	42,532	46,201	43,832	28,155
Synthetic ‡‡	....	100‡	1,699‡	4,608	47,295	150,032	203,454

*Natural rubber refers to dry weights of all types, including liquid latex, guayule, etc. Synthetic includes GR-S, neoprene, butyl, and butadiene-acrylonitrile. Reclaimed includes only natural rubber reclaims from 1939 to 1943, and both natural and synthetic rubber reclaims in 1944 and 1945. All data are from subsequent tables, except for domestic production of natural rubber (consisting entirely of guayule) which is from United States Department of Agriculture for 1943 and Office of Rubber Reserve and predecessor agency for 1944 and 1945.

†Excludes small amounts of Butyl.

‡Estimated.

§See Table 3 for national origin.

‖Less than 0.5 - long ton.

¶Allocations for export are shown for 1941 and 1942, actual exports begin with 1943.

**Not available but believed to be negligible.

††Differences between "new supply" and "distribution" are not precisely comparable with "stocks" due to year-end and inventory adjustments.

‡‡Includes stocks shipped for export which had not yet cleared port.

Source of data: 1939-40, natural and reclaimed, U. S. Department of Commerce; synthetic, U. S. Tariff Commission.
1941-45, Civilian Production Administration, Rubber Division and predecessor agencies.

IN THIS release a comprehensive set of monthly statistics on rubber in wartime is made public for the first time. The American rubber position in recent years may be traced through the figures on the new supply, distribution, and stocks of natural, synthetic, and reclaimed rubber.

The most notable development of the war years is, of course, the emergence of the synthetic rubber industry. Starting almost from scratch in 1940, the output of synthetic rubber rose to 820,000 tons in 1945, an amount 50% greater than the average annual consumption of natural rubber in the United States in the prewar period 1937-39. Almost 98% of this production was in government owned plants, which were built as a result of the government program instituted in 1941 before Pearl Harbor and greatly expanded early in 1942. This program was greatly stimulated by the report of the Rubber Survey Committee (the Baruch report), and its success was enhanced by the cooperation of private industry. Most of the plant facilities were designed for the production of general-purpose (GR-S) rubbers, which accounted for almost 88% of the total synthetic output in 1945. The government program included the development of plants to manufacture feedstocks as well as plants in which the feedstocks were copolymerized to make synthetic rubber. Synthetic rubbers produced in privately-owned plants have been mainly special purpose: i.e., neoprene, butadiene-acrylonitrile types, and Butyl. Neoprene and buadiene-acrylonitrile types were produced in larger volume than any of the other types through 1942; in 1943 each was far outstripped by GR-S. The output of Butyl increased sharply in 1945 and in that year was almost as great as the production of neoprene and butadiene-acrylonitrile types combined.

The prewar supply of natural rubber depended almost entirely upon imports from the Far East. In the face of the impending crisis in the Pacific, imports were expanded from 500,000 tons (gross weight) in 1939 to 1,029,000 tons in 1941 in an effort to build stocks. When the conflict came, the Japanese seized over 90% of the world's natural rubber producing areas. The effect on U. S. imports of natural rubber was first felt early in 1942; in the following year imports from the Far East fell to 20,000 tons *net weight*.[3] Confronted with this situation, the government not only pressed ahead with the synthetic rubber program, but also attempted to develop other sources of supply for natural rubber. Since it requires approximately seven years to bring into fruition the main species of rubber tree, efforts were made to stimulate the collection of wild rubber from all possible sources. Under the auspices of the Rubber Development Corp. imports from Latin America increased from 8,000 tons in 1939 to 38,000 tons in 1945. In the same period imports from Africa rose from 5,500 tons to 36,000 tons. In addition the government promoted the domestic cultivation of guayule, a sage-like shrub which grows in the semi-arid areas of Mexico and the southwestern part of the U. S. Not much rubber came from the domestic source, however, partly because the program was curtailed owing to the need of available irrigated land for food crops.

Despite the rigid restriction of civilian uses of rubber, wartime requirements were so great that the volume of consumption was as large as the supply would permit. Strict controls were introduced to make the supply of natural rubber last until the synthetic rubber

[1]Civilian Production Administration, Rubber Division Release, June 28, 1946. United States Department of Commerce, "Facts for Industry—Series 26-1-1."

[2]Refer all inquiries concerning this Series to Bureau of the Census, Washington 25, D. C.

[3]Net weight excludes impurities which are significant in non-plantation rubbers. Because of the increase in the proportion of wild rubbers in our imports, allowances for the resultant shrinkage has been made beginning in 1943.

TABLE 2. SYNTHETIC RUBBER SUMMARY, 1941-1945

(Long Tons)

Item	1941*	1942	1943	1944	1945
New supply, total	8,383	22,411	231,722	773,673	830,780
Domestic production	8,383	22,411	231,722	762,630	820,373
GR-S†	227	3,721	182,259	670,268	719,404
Neoprene and butadiene-acrylonitrile‡	8,156	18,690	48,090	73,472	53,543
Butyl	§	‖	1,373	18,890	47,426
Imports, total	....	....	....	11,043	10,407
GR-S	....	....	....	9,681	5,455
Neoprene and butadiene-acrylonitrile	....	....	....	....	....
Butyl	....	....	....	1,362	4,952
Distribution, total	6,931	19,049	189,039	670,936	777,358
Domestic consumption, total	6,259	17,629	170,891	566,670	693,580
GR-S	108	2,579	131,977	495,552	600,145
Neoprene and butadiene-acrylonitrile	6,151	15,050	38,610	60,355	50,423
Butyl	§	‖	304	10,763	43,012
Exports, total ¶	672	1,419	18,148	104,266	83,778
GR-S	§	222	14,937	98,380	76,555
Neoprene and butadiene-acrylonitrile	572	1,197	3,171	5,356	6,243
Butyl	§	.....	40	530	980
Stocks, end of year, total**	1,699	4,608	47,295	150,032	203,454
GR-S	130	1,050	36,395	122,412	170,571
Neoprene and butadiene-acrylonitrile	1,569	3,558	9,867	17,628	14,505
Butyl	‖	‖	1,033	9,992	18,378

* Estimated.

† GR-S, previously referred to as Buna S, includes the butadiene-styrene types of synthetic manufactured both by the government and by private industry. It also includes GR-S contents of carbon black GR-S and GR-S latex.

‡ Butadiene-acrylonitrile, previously referred to as Buna N or N-type, includes the butadiene-acrylonitrile types of synthetic manufactured both by the government (GR-A) and by private industry.

§ Data not available.

‖ Data withheld to avoid disclosures.

¶ Allocations for export are shown for 1941 and 1942; actual exports begin with 1943.

** Stocks include shipments for export which had not yet cleared port.

Source of data: New supply, consumption, and stocks: Office of Rubber Reserve, and CPA, Rubber Division and predecessor agencies.

Exports: CPA, Rubber Division and prececessor agencies (1941-42); U. S. Department of Commerce (1943); U. S. Department of Commerce and Office of Rubber Reserve and predecessor agency (1944-45).

TABLE 3. IMPORTS OF NATURAL RUBBER AND NATURAL LATEX,* BY SOURCE, 1939-1945

(Long Tons)

Item	1939	1940	1941	1942	1943	1944	1945
Gross imports (green weight), all countries	499,616	818,242	1,029,007	282,653	60,278	113,929	144,914
Shrinkage†	....	....	....	....	5,308	6,225	9,778
Net imports (dry weight), all countries	499,616	818,242	1,029,007	282,653	54,970	107,704	135,136
Latin America and West Indies total	7,986	11,061	10,786	14,489	26,195	32,779	37,620
Bolivia	242	216	165	157	388	1,664	3,257
Brazil	4,696	5,592	4,553	5,685	12,563	18,694	17,170
Ecuador	698	1,365	1,014	1,966	2,273	2,458	2,252
Mexico (guayule)	2,233	3,634	4,881	5,547	7,708	6,700	10,009
Nicaragua	27	19	32	302	1,382	1,410	1,160
Other	90	235	141	832	1,881	1,853	3,772
Far Eastern areas, total	486,048	799,867	1,007,614	255,527	20,066	60,322	69,849
British Malaya	278,168	421,099	552,141	93,124	11	....	....
Ceylon	34,818	55,001	61,040	34,103	19,675	58,822	64,245
French Indo-China	26,030	28,808	21,876	....	....	....	....
India and Dependencies	3,224	4,479	1,138	169	....	1,500	5,000
Netherland East Indies	143,037	287,624	369,244	128,131	380	....	....
Other	771	2,856	2,175	....	....	....	604
Africa, total	5,517	7,314	10,607	12,582	13,656	19,018	35,703
Belgian Congo	....	243	1,292	311	....	503	3,653
French Cameroons	....	....	....	1,043	....	162	2,821
French Equatorial Africa	....	....	....	120	....	....	3,326
Liberia	5,331	6,917	7,293	10,098	13,656	15,284	20,311
South Africa	....	‡	267	49	....	2,280	1,449
Other	186	154	1,755	961	....	789	4,143
All other sources	65	....	....	55	361	1,810	1,742

* "Natural latex" is a liquid reported on basis of estimated dry-weight content; it becomes "natural rubber" upon coagulation.

† Shrinkage not a significant factor until 1943 and therefore not applied before that time.

‡ Less than 0.5 - long ton.

Source of data: U. S. Department of Commerce, 1939-1941; War Production Board, Rubber Division, 1942-1945.

program began to yield returns. Hence the lowest level of wartime consumption was in 1942 after the U. S. was cut off from Far Eastern rubber and before synthetic rubber became available in large quantities. Stocks of natural rubber declined steadily and in the latter part of 1944 fell below the minimum level of 100,000 tons recommended by the Baruch report. As the production of synthetics increased, total rubber consumption regained the high 1941 level, but synthetic replaced natural rubber as the main type. Thus synthetic rubber, which in January, 1943, constituted only 6% of total natural and synthetic rubber consumption, accounted for 73% in January, 1944, and 85% in January, 1945.

Data in this release for which the Civilian Production Administration and predecessor agencies are cited

TABLE 4. NATURAL RUBBER AND NATURAL LATEX*

NEW SUPPLY, CONSUMPTION, REEXPORTS, AND STOCKS, BY MONTH, 1941-1945

(Long Tons, Estimated Dry Weight)

Period	New Supply†‡			Consumption			Reexports†			Stocks (End of Period)		
	Total	Natural Rubber	Natural Latex	Total	Natural Rubber	Natural Latex‖	Total	Natural Rubber	Natural Latex	Total	Natural Rubber	Natural Latex
1941	1,029,007	§	§	775,000	§	§	5,376	§	§	527,708¶	§	§
1942	282,653	273,058	9,595	376,791	367,399	9,392	10,856	10,856	....	422,714	409,264	13,450
1943	55,329**	53,439	1,890	317,634	308,056	9,578	20,815††	20,691††	124	139,594	133,956	5,638
1944	107,834	104,744	3,090	144,113	138,028	6,085	9,665	9,465	200	93,650	91,207	2,443
1945	135,672	130,904	4,768	105,429	101,543	3,886	6,743	6,539	204	118,715	115,594‡‡	3,121
1941												
January	86,833	§	§	65,989	§	§	292	§	§	309,416	§	§
February	73,973	§	§	62,692	§	§	327	§	§	320,370	§	§
March	87,123	§	§	69,024	§	§	329	§	§	338,140	§	§
April	63,305	§	§	71,374	§	§	234	§	§	329,837	§	§
May	101,404	§	§	71,365	§	§	370	§	§	359,506	§	§
June	64,577	§	§	85,862	§	§	476	§	§	377,745	§	§
July	97,081	§	§	68,793	§	§	423	§	§	365,610	§	§
August	106,540	§	§	56,802	§	§	973	§	§	414,375	§	§
September	83,151	§	§	54,927	§	§	749	§	§	441,850	§	§
October	72,222	§	§	60,665	§	§	777	§	§	452,630	§	§
November	101,418	§	§	54,193	§	§	277	§	§	499,578	§	§
December	91,380	§	§	53,314	§	§	149	§	§	527,708¶	§	§
1942												
January	67,543	66,475	1,068	41,583	39,995	1,588	62	62	....	553,606‖‖	540,879‖‖	12,727
February	83,468	80,418	3,050	33,564	32,572	992	33	33	....	603,477	588,692	14,785
March	56,620	55,694	926	31,526	30,627	899	58	58	....	628,513	613,701	14,812
April	32,904	31,420	1,484	30,561	29,720	841	500	500	....	630,356	614,901	15,455
May	10,480	9,484	996	30,285	29,529	756	2,532	2,532	....	608,019	592,324	15,695
June	2,351	2,335	16	29,845	29,199	646	2,876	2,876	....	577,649	562,584	15,065
July	1,870	1,354	516	32,425	31,729	696	586	586	....	546,508	531,623	14,885
August	2,589	2,250	339	31,183	30,569	614	56	56	....	517,858	503,248	14,610
September	7,013	7,013	....	29,907	29,360	547	33	33	....	494,931	480,868	14,063
October	1,905	1,905	....	28,844	28,240	604	1,753	1,753	....	466,239	452,780	13,459
November	5,593	5,432	161	27,634	27,056	578	747	747	....	443,451	430,409	13,042
December	10,317	9,278	1,039	29,434	28,803	631	1,620	1,620	....	422,714	409,264	13,450
1943												
January	6,241	5,835	406	31,720	30,969	751	1,832	1,832	....	395,403	382,298	13,105
February	4,033	4,033	....	30,069	29,401	668	1,234	1,234	....	368,133	355,696	12,437
March	9,718	8,881	837	31,759	31,045	714	1,453	1,435	18	344,639	332,097	12,542
April	5,084	4,917	167	31,534	30,798	736	2,099	2,099	....	316,090	304,117	11,973
May	3,322	3,322	....	29,156	28,400	756	5,525	5,485	40	284,731	273,554	11,177
June	5,677	5,677	....	30,086	29,307	779	217	217	....	260,105	249,707	10,398
July	2,902	2,902	....	27,253	26,522	731	3,074	3,052	22	232,680	223,035	9,645
August	2,658	2,658	....	24,284	23,513	771	630	630	....	210,424	201,550	8,874
September	3,498	3,270	228	22,982	22,108	874	276	254	22	190,664	182,458	8,206
October	3,890	3,638	252	20,656	19,843	813	2,318	2,318	....	171,580	163,935	7,645
November	1,901	1,901	....	20,617	19,397	1,220¶¶	2,382	2,382	....	150,482	144,057	6,425
December	6,382	6,382	....	17,518	16,753	765	198	176	22	139,594	133,956	5,638
1944												
January	4,436	4,159	277	14,330	13,584	746	341	341	....	129,359	124,190	5,169
February	6,026	6,026	....	14,757	14,170	587	2,191	2,191	....	118,437	113,855	4,582
March	7,957	7,825	132	16,551	15,870	681	350	350	....	109,493	105,460	4,033
April	11,013	10,400	613	13,000	12,411	589	360	360	....	107,146	103,089	4,057
May	12,635	12,635	*†	13,074	12,477	597	2,298	2,298	....	104,409	100,949	3,460
June	5,881	5,207	674	12,287	11,749	538	530	530	....	97,473	93,877	3,596
July	10,220	9,813	407	10,147	9,770	377	484	484	....	97,062	93,436	3,626
August	10,242	9,899	343	11,010	10,610	400	781	581	200	95,513	92,144	3,369
September	7,310	6,851	459	10,216	9,860	356	245	245	....	92,362	88,890	3,472
October	7,919	7,919	....	9,425	9,022	403	266	266	....	90,590	87,521	3,069
November	12,635	12,635	....	9,435	9,024	411	373	373	....	93,417	90,759	2,658
December	11,560	11,375	185	9,881	9,481	400	1,446	1,446	....	93,650	91,207	2,443
1945												
January	15,742	15,536	206	11,411	10,965	446	802	802	....	97,179	94,976	2,203
February	20,427	20,025	402	10,228	9,864	364	425	318	107	106,953	104,819	2,134
March	9,146	8,712	434	10,983	10,565	418	1,797	1,770	27	103,319	101,196	2,123
April	10,046	9,794	252	9,793	9,421	372	867	832	35	102,705	100,737	1,968
May	10,067	9,832	235	10,164	9,796	368	130	135	–5*‡	102,478	100,638	1,840
June	9,940	9,248	692	8,995	8,640	355	204	204	....	103,219	101,042	2,177
July	8,739	8,403	336	7,698	7,357	341	756	756	....	103,504	101,332	2,172
August	10,259	9,635	624	7,392	7,175	217	777	777	....	105,594	103,015	2,579
September	12,150	11,524	626	5,799	5,631	168	560	560	....	111,385	108,348	3,037
October	13,984	13,698	286	7,206	6,984	222	78	78	....	118,085	114,984	3,101
November	7,288	6,992	296	7,575	7,306	269	255	255	....	117,543	114,415	3,128
December	7,884	7,505	379	8,185	7,839	346	92	52	40	118,715	115,594‡‡	3,121

* "Natural latex" is a liquid reported on basis of estimated dry-weight content; it becomes "natural rubber" upon coagulation. In subsequent tables "natural rubber" includes "natural latex."

† Shrinkage applied to new supply beginning in January, 1943, and to reexports beginning in May, 1943, because of increase in non-planatation rubber which required washing; before 1943 shrinkage was of negligible importance.

‡ In addition to imports, includes domestic production as follows: 359 tons in 1943; 130 tons in 1944; and 536 tons in 1945.

‖ Includes 115 tons latex coagulum in 1943, 9 tons in 1944, and 47 tons in 1945.

§ Data not available.

¶ Excludes 5,636 tons actually received in December, 1941, but not included in U. S. Department of Commerce imports until January, 1942. A deduction of 9,787 tons was made in December stocks for fire loss.

** Includes year-end adjustment of + 23 tons.

†† Includes year-end adjustment of —423 tons.

‡‡ Includes inventory adjustment of +1,565 tons.

‖‖ Includes 5,636 tons actually received in December, 1941, but included in U. S. Department of Commerce imports for January, 1942.

¶¶ Includes 385 tons consumed in previous months.

*† Less than O. 5-long ton.

*‡ Reexports of 5 tons in April, 1945, previously classed as "natural latex," reclassed as "natural rubber."

Source of data: New Supply: U. S. Department of Commerce (1941-42); U. S. Department of Commerce, Office of Rubber Reserve and predecessor agency, Rubber Development Corp., and U. S. Department of Agriculture (1943-44); Office of Rubber Reserve and Rubber Development Corp (1945).

Consumption: U. S. Department of Commerce (Jan.-May, 1941); CPA and predecessor agencies (June 1941,–December, 1945).

Reexports: U. S. Department of Commerce, (January, 1941–April, 1943); Office of Rubber Reserve and predecessor agency and Rubber Development Corp. (May, 1943–December, 1945).

Stocks: Calculated from difference between new supply and consumption plus exports; periodically adjusted to reported stocks.

Table 5. Reclaimed Rubber (Natural and Synthetic)*: New Supply, Distribution, and Stocks, By Month, 1941-1945.

(Long Tons)

Period	New Supply†‡	Distribution: Total	Distribution: Domestic Consumption	Distribution: Exports	Stocks (End of Period)
1941	274,202	265,082	251,231	13,851	41,750
1942	286,007	285,225	254,820	30,405	42,532
1943	304,058§	306,760	291,082	15,678	46,201
1944	260,631	262,883	251,083	11,800	43,832
1945	243,309	254,449	241,036	13,413	28,155
1941					
January	20,315	19,647	19,070	577	33,298
February	19,404	19,238	18,229	1,009	33,464
March	21,918	20,652	19,630	1,022	34,730
April	21,468	21,598	20,447	1,151	34,600
May	22,646	22,502	21,400	1,102	34,744
June	23,691	23,463	22,585	878	34,972
July	23,033	20,867	19,878	989	37,138
August	24,092	24,108	22,916	1,192	37,122
September	24,653	24,536	23,467	1,069	37,239
October	26,190	26,514	24,659	1,855	36,915
November	23,039	22,427	20,772	1,655	37,527
December	23,753	19,530	18,178	1,352	41,750
1942					
January	25,010	20,012	18,032	1,980	46,748
February	23,613	24,607	22,490	2,117	45,754
March	24,747	29,707	26,162	3,545	40,794
April	22,425	21,472	18,859	2,613	41,747
May	24,212	20,414	17,540	2,874	45,545
June	24,279	21,783	18,834	2,949	48,041
July	23,418	21,442	19,550	1,892	50,017
August	24,402	21,317	19,277	2,040	53,102
September	22,720	20,319	19,521	798	55,503
October	23,071	25,488	24,272	1,216	53,086
November	23,311	29,755	25,439	4,316	46,642
December	24,799	28,909	24,844	4,065	42,532
1943					
January	25,484	28,897	26,850	2,047	39,119
February	23,545	27,088	24,813	2,275	35,576
March	28,605	30,503	28,630	1,873	33,678
April	27,301	29,526	28,286	1,240	31,453
May	26,111	28,577	27,355	1,222	34,987‖
June	27,299	28,628	27,577	1,051	33,658
July	26,658	25,799	24,905	894	34,517
August	25,887	24,230	23,229	1,001	36,174
September	24,802	21,816	20,970	846	39,160
October	23,747	19,546	18,505	1,041	43,361
November	23,317	21,084	19,800	1,284	45,604¶
December	21,518	21,066	20,162	904	46,201**
1944					
January	24,100	24,174	23,263	911	46,127
February	24,235	25,860	25,280	580	44,502
March	26,515	29,638	28,504	1,134	41,379
April	24,398	25,092	23,197	1,895	40,685
May	22,856	22,444	21,277	1,167	41,097
June	21,772	20,761	19,721	1,040	42,108
July	18,539	17,854	17,157	697	42,793
August	19,409	19,688	19,002	686	42,514
September	19,889	19,013	18,201	812	43,390
October	19,911	19,651	18,941	710	43,650
November	19,512	19,651	18,842	809	43,394††
December	19,495	19,057	17,698	1,359	43,832
1945					
January	21,992	22,196	20,777	1,419	43,628
February	20,131	21,815	20,760	1,055	39,444‡‡
March	22,042	24,300	22,891	1,409	37,186
April	20,389	21,359	20,234	1,125	36,216
May	22,249	23,430	22,459	971	35,035
June	20,187	20,869	19,873	996	34,353
July	17,033	16,812	15,976	836	34,574
August	18,804	19,497	18,663	834	33,881
September	17,246	18,688	17,365	1,323	32,439
October	22,044	23,380	22,185	1,195	31,103
November	20,560	21,122	20,263	859	30,541
December	20,632	20,981	19,590	1,391	28,155§§

* Natural reclaimed only, through 1943, and natural and synthetic rubber reclaims subsequent thereto. Synthetic reclaimed operations not available or sizable prior to 1944.
† Includes imports as follows: 893 tons in 1942, 67 tons in 1943; and 24 tons in 1944.
‡ January-June, 1941, figures estimated on basis of incomplete data. July-December, 1941, figures raised by 2% and January-March, 1942, by 1% to allow for non-reporting companies. Coverage complete for April, 1942-August, 1945. September-December, 1945, based on sample.
§ Includes year-end adjustment of —216 tons.
‖ Includes inventory adjustment of +6,000 tons.
¶ Includes inventory adjustment of +10 tons.
** Includes year-end adjustment of +361 tons of synthetic reclaimed.
†† Includes inventory adjustment of —117 tons.
‡‡ Includes inventory adjustment of —2,500 tons.
§§ Includes inventory adjustment of —2,037 tons.
Source of data: Production and consumption: Based on Rubber Manufacturers Association (January-June, 1941) and CPA, Rubber Division, and predecessor agencies (July, 1941-December, 1945). Imports: U. S. Department of Commerce. Exports: U. S. Department of Commerce and Army Service Forces. Stocks: Calculated from new supply and distribution; periodically adjusted for reported inventories.

Table 6. Synthetic Rubber: GR-S, Butyl, Neoprene, and Butadiene-Acrylonitrile: New Supply, Distribution and Stocks, By Month, 1943-1945

(Long Tons)

Period	New Supply: Total	New Supply: Domestic Production	New Supply: Imports	Distribution: Total	Distribution: Domestic Consumption	Distribution: Exports	Stocks (End of Period): Total	Stocks: Shipped for Export but not Cleared	Stocks: On Hand
1943	231,722*	231,722*	....	189,039	170,891	18,148	47,295	5,727	41,568
1944	773,673	762,630	11,043	670,936	566,670	104,266	150,032	7,105	142,927
1945	830,780	820,373	10,407	777,358	693,580	83,778	203,454	....	203,454
1943									
January	2,911	2,911	....	2,128	2,004	124	5,395	....	5,395
February	2,847	2,847	....	2,654	2,356	298	5,588	....	5,588
March	4,728	4,728	....	3,623	3,336	287	6,693	....	6,693
April	5,806	5,806	....	4,649	4,407	242	7,850	....	7,850
May	8,928	8,928	....	5,785	5,185	600	10,993	....	10,993
June	13,639	13,639	....	8,493	7,934	559	16,139	....	16,139
July	17,058	17,058	....	12,093	11,316	777	21,104	....	21,104
August	24,285	24,285	....	17,543	16,126	1,417	27,846	....	27,846
September	29,874	29,874	....	26,378	22,979	3,399	31,342	....	31,342
October	35,443	35,443	....	30,851	28,621	2,230	35,934	....	35,934
November	42,986	42,986	....	36,264	32,154	4,110	42,656	3,204	39,452
December	43,094	43,094	....	38,578	34,473	4,105	47,295	5,727	41,568
1944									
January	47,250	47,250	....	44,183	38,648	5,535	50,362	5,774	44,588
February	50,970	50,970	....	46,502	37,642	8,860	54,830	6,004	48,826
March	61,383	61,383	....	51,665	40,597	11,068	64,548	6,527	58,021
April	64,137	64,137	....	52,903	39,700	13,203	75,782	4,999	70,783
May	64,547	64,212	335	54,428	45,036	9,392†	85,901	10,752	75,149
June	72,454	70,556	1,898	59,819	45,344	14,475	98,536	5,048	93,488
July	69,031	67,075	1,956	53,490	45,672	7,818	114,077	2,954	111,123
August	66,038	64,809	1,229	55,835	51,442	4,393	124,280	5,302	118,978
September	62,875	61,718	1,157	59,306	52,978	6,328	127,849	7,963	119,886
October	67,196	65,969	1,227	64,503	55,063	9,440	130,542	4,051	126,491
November	71,117	69,968	1,149	62,072	56,395	5,677	139,587	4,495	135,092
December	76,675	74,583	2,092	66,230	58,153	8,077	150,032	7,105	142,927
1945									
January	80,077	79,037	1,040	74,191	64,938	9,253	155,918	2,748	153,170
February	72,013	71,530	483	67,112	60,400	6,712	160,819	650	160,169
March	77,715	77,298	417	68,510	63,846	4,664	170,024	320	169,704
April	76,597	75,846	751	66,125	59,437	6,688	180,496	9	180,487
May	84,727	83,309	1,418	70,272	62,837	7,435	194,951	1,288	193,663
June	79,972	78,702	1,270	65,990	58,627	7,363	208,933	5,915	203,018
July	80,078	78,650	1,428	64,656	52,571	12,085	224,355	5,996	218,359
August	71,194	69,703	1,491	65,295	54,439	10,856	230,254	6,137	224,117
September	64,682	63,754	928	49,280	45,479	3,801	245,656	5,973	239,683
October	47,554	47,317	237	60,263	58,667	1,597	232,947	6,397	226,550
November	49,105	48,634	471	64,211	56,227	7,984	217,841	3,552	214,289
December	47,066	46,593	473	61,453	56,112	5,341	203,454		203,454

* Includes year-end adjustment of +123 tons.
† Includes +1,082 tons applicable to February, 1944.
Source of data: New Supply: Office of Rubber Reserve, and CPA, Rubber Division, and predecessor agencies
Consumption: CPA, Rubber Division, and predecessor agencies.
Exports: United States Department of Commerce (1943) and United States Department of Commerce and Office of Rubber Reserve and predecessor agency (1944-45).
Shipped for export, but not cleared: British Raw Materials Mission and United Stated Treasury Procurement.
Stocks on hand: Calculated from new supply, distribution, and exports not cleared; periodically adjusted for reported inventories.

TABLE 7. GR—S SYNTHETIC RUBBER:
NEW SUPPLY, DISTRIBUTION, AND STOCKS, BY MONTH, 1942-1945
(Long Tons)

Period	New Supply			Distribution			Stocks (End of Period)		
		Domestic production	Imports	Total	Domestic Comsumption	Exports	Total	Shipped for Export but not Cleared	On Hand
1942	3,721	3,721	....	2,801	2,579	222*	1,050	....	1,050
1943	182,259†	182,259†	....	146,914	131,977	14,937	36,395	5,420	30,975
1944	679,949	670,268	9,681	593,932	495,552	98,380	122,412	6,282	116,130
1945	724,859	719,404	5,455	676,700	600,145	76,555	170,571		170,571
1942									
January	105	105	....	60	50‡	10	175	....	175
February	250	250	....	106	106	....	319	....	319
March	102	102	....	263	263	....	158	....	158
April	53	53	....	60	55	5	151	....	151
May	169	169	....	200	200	....	120	....	120
June	303	303	....	245	245	....	178	....	178
July	455	455	....	171	117	54	462	....	462
August	285	285	....	272	236	36	475	....	475
September	297	297	....	431	408	23	341	....	341
October	520	520	....	293	226	67	568	....	568
November	515	515	....	363	340	23	720	....	729
December	667	667	....	337	333	4	1,050	....	1,050
1943									
January	608	608	....	320	316	4	1,338	....	1,338
February	658	658	....	684	465	219	1,312	....	1,312
March	1,836	1,836	....	1,033	970	63	2,115	....	2,115
April	3,113	3,113	....	2,269	2,174	95	2,959	....	2,959
May	5,740	5,740	....	3,285	2,895	390	5,414	....	5,414
June	9,939	9,939	....	6,003	5,558	445	9,350	....	9,350
July	13,197	13,197	....	9,149	8,639	510	13,398	....	13,000
August	19,405	19,405	....	13,784	12,582	1,202	19,019	....	19,019
September	24,139	24,139	....	21,233	18,671	2,562	21,925	....	21,925
October	29,775	29,775	....	25,936	24,087	1,849	25,764	....	25,764
November	37,120	37,120	....	30,391	26,732	3,659	32,493	3,060	29,433
December	36,602	36,602	....	32,827	28,888	3,939	36,395	5,420	30,975
1944									
January	40,232	40,232	....	36,887	32,057	4,830	39,740	5,655	34,085
February	44,170	44,170	....	40,505	32,046	8,459	43,406	5,783	37,622
March	53,832	53,832	....	45,824	35,099	10,725	51,413	6,527	44,886
April	56,642	56,642	....	47,322	34,643	12,679	60,733	4,884	55,849
May	57,027	56,692	335	48,782	39,856	8,926§	68,978	10,437	58,541
June	64,859	62,961	1,898	54,117	40,036	14,081	79,720	4,968	74,752
July	62,248	60,292	1,956	47,957	40,591	7,366	94,011	2,954	91,057
August	58,140	56,957	1,183	49,800	45,534	4,266	102,351	4,710	97,641
September	55,094	54,089	1,005	51,871	46,684	5,187	105,574	7,807	97,767
October	58,489	57,395	1,094	57,938	48,729	9,209	106,125	3,951	102,174
November	62,254	61,285	969	54,656	49,516	5,140	113,723	3,950	109,773
December	66,962	65,721	1,241	58,273	50,761	7,512	122,412	6,282	116,130
1945									
January	70,567	70,067	500	64,101	56,059	8,042	128,878	2,598	126,280
February	63,293	62,811	482	58,353	52,030	6,323	133,818	650	133,168
March	69,665	69,500	165	58,876	54,559	4,317	144,607	320	144,287
April	67,359	66,913	446	56,425	50,646	5,779‖	155,541	9	155,532
May	73,189	72,519	670	59,950	53,251	6,699	168,780	1,138	167,642
June	69,445	68,699	746	57,133	50,416	6,717	181,092	5,615	175,477
July	69,321	68,482	839	56,044	44,974	11,070	194,369	5,996	188,373
August	62,565	61,538	1,027	57,751	47,840	9,911	199,183	5,830	193,353
September	57,016	56,436	580	43,610	40,269	3,341	212,589	5,973	206,616
October	39,307	39,307	....	53,205	51,804	1,401	198,691	6,397	192,294
November	42,217	42,217	....	57,166	49,401	7,765	183,742	3,552	180,190
December	40,915	40,915	....	54,086	48,896	5,190	170,571		170,571

* Derived from allocations for export.
† Includes year-end adjustment of +127 tons.
‡ Estimated.
§ Includes adjustment of +1,082 tons applicable to February, 1944.
‖ Includes adjustment of −100 tons applicable to September, 1944; reclassified to Butyl synthetic.
Source of data: Domestic production: Office of Rubber Reserve and CPA, Rubber Division, and predecessor agencies.
Imports: Office of Rubber Reserve.
Domestic consumption: CPA, Rubber Division, and predecessor agencies.
Exports: CPA, Rubber Division, and predecessor agencies (1942, derived from allocations for export); United Stares Department of Commerce (1943); and United States Department of Commerce and Office of Rubber Reserve and predecessor agency (1944-45).
Shipped for export, but not cleared: British Raw Materials Mission (1942-44) and British Raw Materials Mission and United States Treasury Procurement (1945).
Stocks on hand: Calculated from new supply, distribution, and exports not cleared; periodically adjusted from inventory reports.

TABLE 8. NEOPRENE AND BUTADIENE-ACRYLONITRILE SYNTHETIC RUBBERS:
DOMESTIC PRODUCTION, DISTRIBUTION AND STOCKS, BY MONTH, 1942-1945
(Long Tons)

Period	Domestic Production	Distribution			Stocks (End of Period)		
		Total	Domestic Consumption	Exports	Total	Shipped for Export but not Cleared	On Hand
1942	18,690	16,247	15,050	1,197*	3,558	....	3,558
1943	48,090†	41,781	38,610	3,171	9,867	307	9,560
1944	73,472	65,711	60,355	5,356	17,628	723	16,905
1945	53,543	56,666	50,423	6,243	14,505	....	14,505
1942							
January	935	886	810‡	76	1,164	....	1,164
February	1,014	764	639	125	1,414	....	1,414
March	1,048	781	670	111	1,681	....	1,681
April	1,611	1,340	1,159	181	1,952	....	1,952
May	1,546	1,232	1,159	73	2,266	....	2,266
June	1,531	1,363	1,276	87	2,434	....	2,434
July	1,494	1,369	1,290	79	2,559	....	2,559
August	1,723	1,208	1,127	81	3,074	....	3,074
September	1,458	1,839	1,747	92	2,693	....	2,693
October	1,835	1,817	1,730	87	2,711	....	2,711
November	2,070	1,784	1,693	91	2,997	....	2,997
December	2,425	1,864	1,750	114	3,558	....	3,558
1943							
January	2,303	1,808	1,688	120	4,053	....	4,053
February	2,189	1,970	1,891	79	4,272	....	4,272
March	2,857	2,589	2,365	224	4,540	....	4,540
April	2,585	2,379	2,232	147	4,746	....	4,746
May	3,017	2,497	2,267	210	5,266	....	5,266
June	3,586	2,473	2,361	112	6,379	....	6,379
July	3,723	2,893	2,654	239	7,209	....	7,209
August	4,733	3,744	3,529	215	8,198	....	8,198
September	5,656	5,119	4,282	837	8,735	....	8,735
October	5,635	4,870	4,490	380	9,500	....	9,500
November	5,771	5,789	5,338	451	9,482	144	9,338
December	6,038	5,650	5,493	157	9,867	307	9,560
1944							
January	6,185	7,179	6,474	705	8,873	119	8,754
February	5,972	5,832	5,438	394	9,013	221	8,792
March	6,204	5,595	5,286	309	9,622	....	9,622
April	6,339	5,289	4,815	474	10,672	115	10,557
May	6,228	5,294	4,829	465	11,606	315	11,291
June	6,474	4,995	4,698	297	13,085	80	13,005
July	6,352	4,724	4,273	451	14,713	....	14,713
August	6,852	4,851	4,724	127	16,714	592	16,122
September	6,375	6,103	4,962	1,141	16,986	152	16,834
October	6,569	5,052	4,861	191	18,503	....	18,503
November	5,363	5,504	5,067	437	18,362	445	17,917
December	4,559	5,293	4,928	365	17,628	723	16,905
1945							
January	5,236	6,619	5,526	1,093	16,245	150	16,095
February	5,375	5,272	4,902	370	16,348	....	16,348
March	4,354	5,903	5,562	341	14,799	....	14,799
April	6,193	6,074	5,265	809	14,918	....	14,918
May	6,090	6,164	5,429	735	14,844	....	14,844
June	5,226	5,381	4,737	644	14,689	....	14,689
July	5,523	4,657	1,046	611	15,555	....	15,555
August	3,966	4,279	3,335	944	15,242	7	15,235
September	2,899	2,777	2,629	148	15,364	....	15,364
October	3,164	3,211	3,031	180	15,317	....	15,317
November	2,582	3,259	3,040	219	14,640	....	14,640
December	2,935	3,070	2,921	149	14,505	....	14,505

* Derived from allocations for export.
† Includes year-end adjustment of −3 tons.
‡ Estimated.
Source of data: Domestic production: Office of Rubber Reserve and CPA, Rubber Division, and predecessor agencies.
Domestic consumption: CPA, Rubber Division, and predecessor agencies.
Exports: CPA, Rubber Division, and predecessor agencies (1942, derived from allocations for export); United States Department of Commerce (1943-44); and United States Department of Commerce and Office of Rubber Reserve and predecessor agency (1945).
Shipped for export, but not cleared: British Raw Materials Mission.
Stocks on hand: Calculated from new supply, distribution, and exports not cleared; periodically adjusted for reported inventories.

TABLE 9. BUTYL SYNTHETIC RUBBER:
NEW SUPPLY, DISTRIBUTION, AND STOCKS, BY MONTH, 1943-1945
(Long Tons)

Period	New Supply: Total	New Supply: Domestic Production	New Supply: Imports	Distribution: Total	Distribution: Domestic Consumption	Distribution: Exports	Stocks (End of Period): Total	Stocks: Shipped for Export but not Cleared	Stocks: On Hand
1943	1,373*	1,373*	....	344	304	40	1,033	....	1,033
1944	20,252	18,890	1,362	11,293	10,763	530	9,992	100	9,892
1945	52,378	47,426	4,952	43,992	43,012	980	18,378	....	18,378
1943									
January	....	....	....	....	†	....	4	....	4
February	....	....	....	....	†	....	4	....	4
March	35	35	....	1	1	....	38	....	38
April	108	108	....	1	1	....	145	....	145
May	171	171	....	3	3	....	313	....	313
June	114	114	....	17	15	2	410	....	410
July	138	138	....	51	23	28	497	....	497
August	147	147	....	15	15	....	629	....	629
September	79	79	....	26	26	....	682	....	682
October	33	33	....	45	44	1	670	....	670
November	95	95	....	84	84	....	681	....	681
December	454	454	....	101	92	9	1,033	....	1,033
1944									
January	833	833	....	117	117	....	1,749	....	1,749
February	828	828	....	165	158	7	2,412	....	2,412
March	1,347	1,347	....	246	212	34	3,513	....	3,513
April	1,156	1,156	....	292	242	50	4,377	....	4,377
May	1,292	1,292	....	352	351	1	5,317	....	5,317
June	1,121	1,121	....	707	610	97	5,731	....	5,731
July	431	431	....	809	808	1	5,353	....	5,353
August	1,046	1,000	46	1,184	1,184	....	5,215	....	5,215
September	1,406	1,254	152	1,332	1,332	....	5,289	4	5,285
October	2,138	2,005	133	1,513	1,473	40	5,914	100	5,814
November	3,500	3,320	180	1,912	1,812	100	7,502	100	7,402
December	5,154	4,303	851	2,664	2,464	200	9,992	100	9,892
1945									
January	4,274	3,734	540	3,471	3,353	118	10,795	....	10,795
February	3,345	3,344	1	3,487	3,468	19	10,653	....	10,653
March	3,696	3,444	252	3,731	3,725	6	10,618	....	10,618
April	3,045	2,740	305	3,626	3,526	100‡	10,037	....	10,037
May	5,448	4,700	748	4,158	4,157	1	11,327	150	11,177
June	5,301	4,777	524	3,476	3,474	2	13,152	300	12,852
July	5,234	4,645	589	3,955	3,551	404	14,431	....	14,431
August	4,663	4,199	464	3,265	3,264	1	15,829	300	15,529
September	4,767	4,419	348	2,893	2,581	312	17,703	....	17,703
October	5,083	4,846	237	3,847	3,832	15	18,939	....	18,939
November	4,306	3,835	471	3,786	3,786	....	19,459	....	19,459
December	3,216	2,743	473	4,297	4,295	2	18,378	....	18,378

* Includes year-end adjustment of −1 ton.
† Less than 0.5- ton.
‡ Adjustment of +100 tons applicable to September, 1944, at which time this export was classified as GR-S.
Source of data: Domestic production and imports: Office of Rubber Reserve and predecessor agency.
Domestic consumption: CPA, Rubber Division, and predecessor agencies.
Exports: United States Department of Commerce and Office of Rubber Reserve (1944-45).
Shipped for export, but not cleared: British Raw Materials Mission.
Stocks on hand: Calculated from new supply, distribution, and exports not cleared; periodically adjusted for reported inventories.

as the source were derived from Forms CPA-3410 (formerly WPB-76 and PD-49) and PD-36 and PD-36A. Coverage is complete for all data through August, 1945, except where estimates are indicated. For the period September through December, 1945, coverage is complete except for consumption and stocks of reclaimed rubber, GR-S, neoprene, and butadiene-acrylonitrile types, which were based upon samples.

TABLE 10. CONSUMPTION OF NATURAL AND SYNTHETIC RUBBERS, BY TYPE, 1942-45
(In Percentages)

Period	Total	Natural	Synthetic: Total	Synthetic: GR-S	Synthetic: Neoprene and Butadiene-Acrylonitrile	Synthetic: Butyl
1942	100.0	95.5	4.5	0.7	3.8	*
1943	100.0	65.0	35.0	27.0	7.9	0.1
1944	100.0	20.3	79.7	69.7	8.5	1.5
1945	100.0	13.2	86.8	75.1	6.3	5.4
1943						
January	100.0	94.1	5.9	0.9	5.0	*
February	100.0	92.7	7.3	1.4	5.9	*
March	100.0	90.5	9.5	2.8	6.7	*
April	100.0	87.7	12.3	6.0	6.3	*
May	100.0	84.9	15.1	8.4	6.7	*
June	100.0	79.1	20.9	14.7	6.2	*
July	100.0	70.6	29.4	22.4	6.9	0.1
August	100.0	60.1	39.9	31.2	8.7	*
September	100.0	50.0	50.0	40.6	9.3	0.1
October	100.0	41.9	58.1	48.9	9.1	0.1
November	100.0	39.1	60.9	50.6	10.1	0.2
December	100.0	33.7	66.3	55.5	10.6	0.2
1944						
January	100.0	27.0	73.0	60.5	12.3	0.2
February	100.0	28.1	71.9	61.2	10.4	0.3
March	100.0	29.0	71.0	61.4	9.2	0.4
April	100.0	24.7	75.3	65.7	9.1	0.5
May	100.0	22.5	77.5	68.6	8.3	0.6
June	100.0	21.3	78.7	69.4	8.2	1.1
July	100.0	18.2	81.8	72.7	7.7	1.4
August	100.0	17.6	82.4	72.9	7.6	1.9
September	100.0	16.1	83.9	73.9	7.9	2.1
October	100.0	14.6	85.4	75.5	7.6	2.3
November	100.0	14.3	85.7	75.2	7.7	2.8
December	100.0	14.5	85.5	74.6	7.3	3.6
1945						
January	100.0	14.9	85.1	73.4	7.3	4.4
February	100.0	14.5	85.5	73.7	6.9	4.9
March	100.0	14.7	85.3	72.9	7.4	5.0
April	100.0	14.1	85.9	73.2	7.6	5.1
May	100.0	13.9	86.1	72.9	7.5	5.7
June	100.0	13.3	86.7	74.5	7.1	5.1
July	100.0	12.8	87.2	74.6	6.7	5.9
August	100.0	12.0	88.0	77.4	5.4	5.2
September	100.0	11.3	88.7	78.5	5.1	5.1
October	100.0	10.9	89.1	78.7	4.6	5.8
November	100.0	11.9	88.1	77.5	4.7	5.9
December	100.0	12.7	87.3	76.1	4.5	6.7

* Less than 0.05%.
Source of data: CPA from sources indicated on previous tables.

Publications of Simplex Wire & Cable Co., Cambridge, Mass. **"Simplex Aerial Cables."** Data Sheet 116. June, 1946. 4 pages. The company's aerial cables are illustrated and described, with information on supporting methods, splicing and terminating, and methods of installation. **"Simplex Self-Supporting Aerial Cable."** Data Sheet 117. June, 1946. 4 pages. This illustrated bulletin describes the company's jute-braided and neoprene-jacketed types of self-supporting aerial cable. Also given are applications and advantages, installation, and sags and tensions of cables, plus a table of current carrying capacities.

EDITORIALS

India RUBBER WORLD Editorial Advisory Board

THE tremendously accelerated growth of the rubber industry during the past several years, its entrance into the field of large-scale production of synthetic rubbers as well as into the fields of plastics production and fabrication, have all had the effect of greatly broadening the scope of the coverage required of INDIA RUBBER WORLD in order that it could continue to serve the industry in the same comprehensive manner that it has during the past 57 years. Consequently it has been decided, after discussing the matter with representatives of the several branches of the industry, to ask certain of these representatives to act as an Editorial Advisory Board for INDIA RUBBER WORLD so that they will be available to assist the editor in evaluating some of the many special phases of our now very much expanded and diversified industry. Of course all trade and technical publications seek advice more or less regularly from various members of the industries they serve, but not in all cases is this done on an official basis, nor is recognition given by the publication for the assistance rendered.

The members of the INDIA RUBBER WORLD Editorial Advisory Board have all agreed, in spite of the very great burden of their present-day activities, to provide the editor with advice and consultation on the latest developments in the rubber and plastics industries for the period from September, 1946, until January, 1948, and for this we are most grateful. At the end of this period or even before, it is expected that some of the members of the Board will desire to relinquish their positions on the Board because of a change in the type or place of their regular activities or for various other reasons of their own. These members will be replaced by other leading technical authorities of the particular branches of the industry involved, and this policy will have the additional advantage of permitting periodic changes in the make-up of the Board.

The Board is composed of ten members and includes some of the best-known technical men in the several branches of the rubber and associated industries. The members and the special fields in which they will advise INDIA RUBBER WORLD are as follows: John M. Ball, reclaimed rubber and compounding ingredients for rubber; Sam L. Brous, plastics and new products for plastics and rubber; C. C. Davis, mechanical goods and rubber literature; J. H. Dillon, the physics of rubber and plastics; Harry L. Fisher, the chemistry of rubber and plastics and component materials; Arthur E. Juve, general compounding and tires; William E. Kavenagh, soles and heels; A. R. Kemp, wire and cable, hard rubber, and rubber chemistry and technology; C. E. Reynolds, footwear and proofing; and S. I. Strickhouser, general sundries and latex compounding and processing. With the help of these men it will be possible to insure that the service provided the readers of INDIA RUBBER WORLD will be more than ever in tune with the broader aspects of the postwar rubber industry.

It is felt that in presenting the names of the members of our Editorial Advisory Board, some information concerning their background and present position in industry would be of interest, and this has been assembled on the accompanying page. In addition, photographs of the members have been provided for those readers who may be making the acquaintance of these men for the first time.

Early Return of a Free Rubber Market?

AT FIRST glance it is a bit surprising to read of a statement made in London in mid-August by F. D. Ascoli, chairman of the British Rubber Growers' Association, that this association is requesting its government to permit the return to a free market in rubber as soon as the present agreement with the United States ends on December 31, 1946.

Under the recent agreement signed by the United States with the governments of Great Britain, the Netherlands, and France, we agreed to purchase about 150,000 long tons of natural rubber from the Far East between July 1, 1946, and January 1, 1947, at a price of 23½¢ a pound, but under the system of a controlled market, only 150,000 tons. Rubber output and stocks in the Malay States, together with imports from Dutch Borneo, Sumatra, and neighboring islands have exceeded earlier estimates, according to a report credited to the chairman of the Singapore Chamber of Commerce Rubber Association. The United States allocation for the third quarter of 50,000 tons was taken care of almost overnight, and it was necessary to ask the United States to take its fourth quarter allotment of 45,000 tons for shipment in August and September, it was added, in order to prevent an internal price collapse in the Far East through the inability of the trade to absorb further quantities. The Rubber Directorate of the British Board of Trade, which is required to buy all surplus stocks, was reported as a reluctant purchaser.

The attitude of consumers in the United States seems in favor a free rubber market, judging from the statement made by John L. Collyer, of the Goodrich Company, on August 14, and supported by Harvey S. Firestone, Jr., of the Firestone company, Herbert E. Smith, of the U. S. Rubber company, and William O'Neil, of The General Tire & Rubber Co. It is probable that these industry leaders feel that the United States can be assured of its minimum natural rubber requirements at a price of not more than 25¢ a pound under any conditions, and that with a free market a much larger quantity can be secured at a considerably lower price. If not, 18½¢-a-pound GR-S can be used instead.

Scientific and Technical Activities

India RUBBER WORLD Editorial Advisory Board

AS MENTIONED on the editorial page, we feel that information on the background and present position in industry of the members of INDIA RUBBER WORLD's Editorial Advisory Board, together with a recent photograph of each of the members, would be of definite interest in announcing this new Board; so this information and the photographs follow.

John M. Ball, Midwest Rubber Reclaiming Co., East St. Louis, Ill. Mr. Ball is a graduate of Cornell University, where he received his degree in chemistry in 1916. After working for the Goodyear Tire & Rubber Co. and the Combination Rubber Mfg. Co. prior to World War I, he served in the Chemical Warfare Service until 1919, when he joined the Manhattan Rubber Mfg. Co., where he remained until 1921. From 1921 to 1945, John Ball was connected with the R. T. Vanderbilt Co. as a salesman and also as technical editor of this company's publications on the compounding and processing of rubber. Most recently he joined the Midwest Rubber Reclaiming Co. as eastern sales representative. Mr. Ball spent a large amount of time with the War Production Board in Washington during World War II. He will advise INDIA RUBBER WORLD on matters pertaining to the reclaimed rubber industry and compounding ingredients for all rubbers.

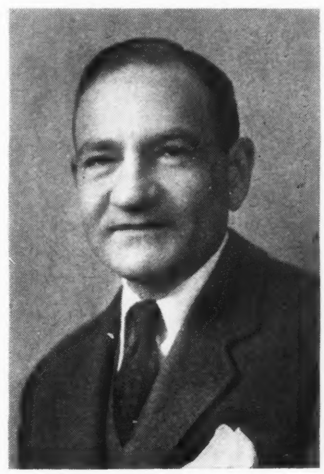
Sam L. Brous, B. F. Goodrich Chemical Co., Cleveland, O. Mr. Brous graduated in chemical engineering from the University of Missouri in 1928 and received a master's degree in organic chemistry from the same university in 1929. His industrial career has been spent entirely with The B. F. Goodrich Co. and the B. F. Goodrich Chemical Co. One of the pioneer workers in plastics and synthetic rubbers in the rubber companies, Mr. Brous has been concerned first with research, development, and technical service of plastics and has recently been made sales development manager of new products for the B. F. Goodrich Chemical Co. He will aid INDIA RUBBER WORLD in developing and improving our Plastics Technology department, started in August, 1945, and will also assist in keeping us in touch with new products for the plastics and rubber industries.

C. C. Davis, Boston Woven Hose & Rubber Co., Cambridge, Mass. A graduate of both Dartmouth College and Massachusetts Institute of Technology, Mr. Davis received his B.S. degree from the former in 1911 and from the latter in 1914. He has been with Boston Woven Hose since 1914 and since 1925 has been chief chemist. In addition, C. C. Davis is well known for his years of service as editor of the A. C. S. publication, *Rubber Chemistry and Technology*, as assistant editor of *Chemical Abstracts*, and possibly more particularly as editor with John T. Blake, of the A. C. S. Monograph, "The Chemistry and Technology of Rubber." A member of the executive committee of the Division of Rubber Chemistry of the A. C. S. and of its bibliography committee and a consultant of the WPB and now the CPA on rubber products, Mr. Davis will aid INDIA RUBBER WORLD in the mechanical rubber goods field and also in the field of rubber literature.

J. H. Dillon, Firestone Tire & Rubber Co., Akron, O. Dr. Dillon received his bachelor's degree from Ripon College and his master's and doctor's degrees from the University of Wisconsin, in both places specializing in physics and mathematics. After receiving his Ph.D. in 1931, he joined the Firestone company, where he has remained ever since. From 1937 to 1945 he was head of the physics division and since 1945 has been assistant director of the chemical and physical research laboratories for the Firestone company. Dr. Dillon has devoted the major part of his time to research on rheological properties of unvulcanized rubbers, the physics of vulcanized rubbers

Kaiden-Kazanjian

A. R. Kemp



John Ball

Providence Journal Co.

S. I. Strickhouser

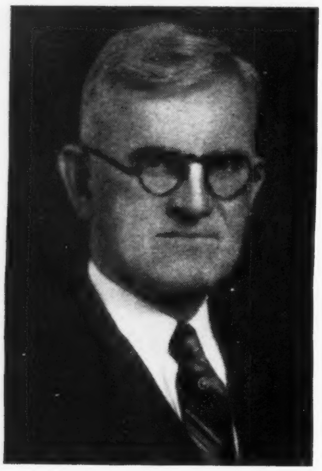
C. C. Davis

Harry L. Fisher

Arthur E. Juve

C. E. Reynolds

J. H. Dillon



Berkeley Studio

William E. Kavenagh

Sam L. Brous

and plastics, colloidal chemistry and physics as applied to latices, research on tire cord materials, and industrial applications of radio-active materials. Dr. Dillon is past chairman of the Division of High Polymer Physics of the American Physical Society. He will aid INDIA RUBBER WORLD in the important field of the physics of rubber and plastics.

Harry L. Fisher, U. S. Industrial Chemicals, Inc., Stamford, Conn. Dr. Fisher obtained his bachelor's degree from Williams College and his master's and doctor's degrees from Columbia University. After receiving his Ph.D. in 1912, he taught organic chemistry at Columbia until 1919. From 1919 until 1926, Dr. Fisher was a research chemist with The B. F. Goodrich Co. in Akron, and from 1926 until 1936 he occupied a similar position with the United States Rubber Co. in New York and in Passaic, N. J. He has been director of organic research for U. S. Industrial Chemicals, Inc., since 1936. During the late war Dr. Fisher spent much time in Washington as a consultant to the Office of the Rubber Director and the Office of Rubber Reserve. With the latter bureau he has been assistant chief of the Polymer Research Branch. Dr. Fisher has had many publications in the fields of rubber and plastics chemistry and the chemistry and industrial application of organic chemicals. He will advise INDIA RUBBER WORLD on the chemistry of rubbers and plastics and the chemistry of materials used in compounding them.

Arthur E. Juve, B. F. Goodrich Co., Akron, O. A graduate of Ohio State University with a degree in chemical engineering in 1925, A. E. Juve joined the Goodrich company during the same year and has been concerned with compounding development for many rubber products including tires and more recently research on the compounding of synthetic rubbers for the 21 years he has been with this company. He is at present a research supervisor in the synthetic rubber research department of the company. Mr. Juve will afford INDIA RUBBER WORLD the benefit of his experience in the fields of general compounding and tires.

William E. Kavenagh, Goodyear Tire & Rubber Co., Windsor, Vt. A graduate of Harvard in 1908 with a degree in chemical engineering, Mr. Kavenagh was associated with the Goodyear company even before that time (1900-1904) at the Akron plant. Returning to Akron in 1908, he was employed as a chemist at the Goodyear plant until 1910, when he was transferred to a Canadian plant. Following an assignment in England with the North British Rubber Co., he returned to the Akron plant of Goodyear in 1914, where he worked on mechanical goods development until 1916. From 1916 to 1925, Mr. Kavenagh carried on a general consultant practice for several years, following which he became factory manager for the Plymouth Rubber Co. until 1925. After another period from 1925 to 1930 at the Akron plant of Goodyear as a tire and tube compounder, Mr. Kavenagh was transferred to work on soles and heels. He has been at the Windsor plant of Goodyear since 1936, where he has the position of development manager. Mr. Kavenagh investigated the German sole and heel industry as a member of a TIIC mission in 1945. He will advise INDIA RUBBER WORLD on matters pertaining to the sole and heel industry.

A. R. Kemp, Bell Telephone Laboratories, Murray Hill, N. J. A. R. Kemp received his bachelor's degree in chemistry from the California Institute of Technology in 1917 and his M.S. from the same institution in 1918. He was employed as a research chemist at the Western Electric Co. from 1918 until 1925 and has been at the Bell Telephone Laboratories from 1925 until the present time, where he is in charge of research and development work on rubber and insulating materials. Mr. Kemp is a past chairman of the Division of Rubber Chemistry, A. C. S., and was a special representative of the American Chemical Society to the London Rubber Technology Conference in 1938. He also acted at that time as a special correspondent for INDIA RUBBER WORLD on proceedings at the London Rubber Conference. The author of many publications on the chemistry and technology of rubber with special reference to its use as an insulating material, Mr. Kemp will assist INDIA RUBBER WORLD in the evaluation of developments in the fields of wire and cable, hard rubber, and in the broader field of rubber chemistry and technology.

C. E. Reynolds, Cambridge Rubber Co., Cambridge, Mass. Mr. Reynolds graduated from Pratt Institute of Technology in 1923 as a chemical engineer and from 1923 until 1929 was connected

with the Vulcan Proofing Co. of New York as chief chemist and then as assistant superintendent. From 1929 to date he has been chief chemist and technical director for the Cambridge Rubber Co. Mr. Reynolds will advise INDIA RUBBER WORLD in the footwear and proofing fields, in which he has had so many years of experience.

S. I. Strickhouser, United States Rubber Co., Providence, R. I. After receiving his bachelor's degree from Pennsylvania State College and his master's and doctors' degrees from the University of Illinois, the last mentioned in 1926, Dr. Strickhouser joined U. S. Rubber, where he was employed as a research chemist at New York and Passaic from 1926 until 1932. Transferred to the Providence plant of the company, he continued as a research chemist until 1936, when he was made assistant development manager, then development manager in 1941, and more recently assistant factory manager in 1945. Dr. Strickhouser has had much experience in the general sundries field and in the field of latex compounding and processing and was a member of the WPB technical advisory committee on drug sundries during the late war. He will assist INDIA RUBBER WORLD in the sundries and latex fields.

A.S.T.M. Annual Meeting

THE annual meeting of the American Society for Testing Materials, held in Buffalo, N. Y., during the week of June 24, had an attendance of 1,825 registered members and guests, the second highest registration recorded by the Society for such a meeting. The meeting was outstanding in many respects and included eight symposiums with technical papers covering a wide diversity of fields. Besides the meetings of the various committees and sub-committees, there was a very extensive exhibit of testing apparatus and of photographs.

The Edgar Marburg Lecture by J. J. Mattiello, technical director, Hilo Varnish Corp., on "Protective Organic Coatings as Engineering Materials," given the afternoon of June 26, was of very great interest to the members, judging from the large attendance. The Lecture will be presented in printed form early in the fall. The nineteenth award of the Charles B. Dudley Medal was made to H. R. Copson of the research laboratories of the International Nickel Co.

At the annual meeting dinner on June 26 in the ballroom of the Hotel Statler, J. R. Townsend gave his presidential address on "The Challenge of National and International Affairs to the Engineer," and the guest speaker, B. K. Sandwell, editor of Canada's publication *Saturday Night*, spoke on "A Testing Time for Canada." Mr. Townsend's address is to be published in the August issue of the *A.S.T.M. Bulletin*.

As reported last month, Arthur W. Carpenter of The B. F. Goodrich Co., was elected president for 1946-1947, succeeding Mr. Townsend, of Bell Telephone Laboratories, Inc., who will continue on the board of directors as past-president for three years. R. L. Templin, Aluminum Co. of America, is the new vice president to serve with senior vice president T. A. Boyd, General Motors Corp. The new members of the board of directors are: A. G. Ashcroft, Alexander Smith & Sons Carpet Co.; A. T. Chameroy, Sears, Roebuck & Co.; J. H. Foote, Commonwealth & Southern Corp.; F. E. Richart, University of Illinois; and L. H. Winkler, Bethlehem Steel Co., Inc.

The meetings of Committee D-11 on Rubber Products and its many sub-committees were very well attended. Simon Collier, Johns-Manville Corp., was reelected chairman of D-11, and Harry Outcault, St. Joseph Lead Co., was elected vice chairman. Mr. Carpenter will continue as secretary of D-11 as well as president of the Society. At the meeting of the D-11 Committee it was announced that that committee would meet with the Society in Philadelphia in February, 1947, at which time the formal opening of the new A.S.T.M. headquarters would take place. The next annual meeting is scheduled for Atlantic City in June, 1947. Action on the many specifications of Committee D-11, as recommended by the chairman of the various sub-committees, was reported and accepted by the members of D-11 as a whole. These actions on hose, wire and cable, rubber coated fabrics, chemical analysis, etc., will be reported in detail as soon as received from A.S.T.M.

E. W. Madge Discusses Latex

THE Thiokol Technical Club held a summer meeting at the Thiokol plant, Trenton, N. J., on July 25 with approximately 45 members and guests attending. Guest speaker for the evening was E. W. Madge, of Dunlop Rubber Co., Ltd., Birmingham, England. Mr. Madge spoke of some of the recent advances in the art of natural rubber latex handling and use in England. He also discussed emulsion polymers and artificial dispersions. In concluding, the speaker considered the possibilities for future developments with latices and latex-like products. An article by Mr. Madge on this subject appears on page 803.

A. C. S. Rubber Division Synthetic Rubber Nomenclature

THE executive committee of the Division of Rubber Chemistry of the American Chemical Society has adopted the term "Nitrile Rubbers" for butadiene-acrylonitrile copolymers (Buna N) and voted to recommend its general adoption for designating "butadiene-acrylonitrile copolymers, with or without other comonomers present," in the presentation and publication of all technical and scientific papers appearing in this country.

Among the reasons for this action was the explanation that, during the war in the desire to get away from the German nomenclature, a number of trade names for the butadiene-acrylonitrile rubbers gained usage. As a result, there exists no uniformity in the terminology now employed in technical publications in naming this group of polymers.

Since the American Society for Testing Materials adopted this same nomenclature of "Nitrile Rubbers" in June, 1945, the action by the Division of Rubber Chemistry, A. C. S., is an endorsement of the nomenclature originally selected and approved by A.S.T.M.

German Patent Licensing

THE Alien Property Custodian, J. E. Markham, has announced the recent accord on German owned patents extends his office's policy of licensing these patents on a non-exclusive, royalty-free basis to citizens of the 11 other nations signing the accord, in addition to American citizens. The patents which are being licensed to citizens of other countries under the accord are those in which there are no lawfully acquired proprietary interests, licenses, or claims held by non-Germans prior to August 1, 1946. Lawfully acquired exclusive licenses will be respected, and legitimate prewar contracts with respect to vested German patents will remain in force.

Under the terms of the accord, American citizens will be able to secure similar licenses for the use of former wholly German-owned patents issued by the other governments participating in the accord. In the various countries more than 100,000 patents will be affected by the accord, Mr. Markham revealed. He estimated that about 19,000 German patents and patent applications seized by the United States are now licensable under the accord. Mr. Markham also stated that approximately 8,000 seized German patents have been licensed one or more times to American citizens during the past four years.

Course on Fabric Coatings

A NEW course in "Coatings and Finishes on Fabrics" will be offered for first time this autumn as part of the Evening Textile Courses at Columbia University, New York 27, N. Y., according to an announcement by Herbert R. Mauersberger, director of the textile courses. The course will be given on Tuesdays from 6:35 to 8:15 p.m., for the period extending from October 1, 1946, to January 21, 1947. The instructor will be Marcel Pageric, research director and technical adviser of Allied Textile Printers, Inc., Paterson, N. J.

The course is open to all interested in the subject. Registration will begin September 19 at the Office of the Registrar, East Corridor, University Hall, Columbia University, 116th St. and Broadway. Further information and a descriptive folder on the course may be obtained from the registrar.

New Navy Specifications

THREE new specification titles appearing since our previous listing in the August issue are given below, in accordance with INDIA RUBBER WORLD'S policy to keep the rubber industry currently advised of changes in or additions to pertinent Navy Department Specifications and Bureau of Ships' Ad Interim Specifications. Those members of the industry desiring copies of these specifications can obtain them upon request, giving title, number, and date, from the Navy Department Bureau of Supplies and Accounts, Washington 25, D. C.

The new specifications are as follows:

Navy Dept. Spec. 37G2—Gloves, Synthetic-Rubber, dated 1 April 1946 (9 pp).
Navy Dept. Spec. 33H5c—Hose, Suction, Water, Smooth-Bore, dated 1 June 1946 (8 pp).
BuShips Spec. 27M12 (SHIPS)—Mats, Rubber, Synthetic, for Shower Stalls, dated 15 June 1946 (5 pp).

Additional Experimental GR-S and GR-S Latices

ADDITIONS to the list of experimental GR-S dry polymers and GR-S latices available for distribution to rubber goods manufacturers from the Office of Rubber Reserve, RFC, under the conditions outlined in our November, 1945, issue, page 237, have been received and are listed below:

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description	Special Characteristics
X-305-GR-S*	U. S. Rubber, Institute	6/19/46	Regular GR-S except MTM modifier is used in place of DDM.	
X-307-GR-S*	Goodrich, Port Neches	6/19/46	GR-S-10 except that MTM modifier is used in place of DDM.	
X-318-GR-S*	Goodyear, Akron	7/2/46	GR-S made by continuous polymerization with MTM used in place of DDM.	
X-312-GR-S	Goodrich, Louisville	7/9/46	Similar to GR-S-50 except that the Mooney range is 40-50.	GR-S-50 is a copolymer of butadiene and styrene to which 1.5% of Stalite antioxidant has been added. Improved processibility is to be expected from the lowered Mooney.
X-314-GR-S	General, Baytown	6/17/46	Masterbatch containing 50 parts EPC black and 100 parts of a GR-S-10-type polymer made at slightly higher temperature to normal conversion, with modifier adjusted to a Mooney viscosity of the unpigmented polymer of 35 ± 5.	This polymer is similar to X-297 except for the lower Mooney viscosity. Because of this, superior processing and handling characteristics are to be expected.
X-315-GR-S	U. S. Rubber, Institute	6/24/46	Masterbatch containing 50 parts Silene EF and 100 parts of a 40 Mooney rubber, stabilized with 1.5 EFED.	For use in industrial products and specialties where this type of polymer is desired.
X-317-GR-S	U. S. Rubber, Institute	7/12/46	GR-S-20 AC made with a (non-staining) shortstopping agent, using 1.5 EFED as a stabilizer.	For use in goods where non-staining antioxidant is desired.
X-319-GR-S	Polymer Corp., Ltd., Sarnia	6/26/46	Regular GR-S made by continuous polymerization with water to monomer ratio adjusted to increase plant output.	This polymer should have similar properties to regular GR-S.
X-322-GR-S	Copolymer, Baton Rouge	7/25/46	GR-S made to a slightly lower conversion, using a teritiary mercaptan as modifier.	This polymer is being made and tested in view of the possible future shortage of DDM.
X-323-GR-S	Goodrich, Louisville	7/18/46	GR-S made with a high percentage of styrene and carried to a higher conversion; Mooney 50-70 (small rotor).	Somewhat superior stress-strain properties should result from this type of polymer.
X-324-GR-S	Goodrich, Louisville	7/25/46	GR-S-50 at slightly higher conversion.	GR-S-50 is a copolymer of butadiene and styrene to which approximately 1.5% of Stalite antioxidant has been added. For same purpose use as GR-S-50.
X-325-GR-S	National Synthetic, Louisville	8/5/46	GR-S-50 made with MTM modifier instead of DDM.	This polymer is being made and tested at present in view of the possible future shortage of DDM.
X-326-GR-S	General, Baytown	7/29/46	Same as GR-S Black I except that it contains 15 parts of EPC Black instead of 50 parts.	Carbon black masterbatches are reported to have superior processing and handling characteristics. For use in stocks requiring this type of black or mixtures of EPC and other blacks.
X-328-GR-S	Firestone, Akron	7/29/46	Latex of X-318-GR-S coagulated with alum.	X-318 is a polymer made by continuous polymerization with MTM used in place of DDM. This polymer is being tested now in view of a possible shortage of DDM.

* The first three new polymers are being made and tested at the present time in view of the possible future shortage of DDM.

Reauthorizations have been issued for the following 15 polymers which were previously authorized, made, and in consumers' tests found advantageous:

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description	Special Characteristics
X-222-GR-S	Firestone, Akron	6/26/46	Alum coagulated GR-S made with dehydrogenated rosin soap.	Polymers made with dehydrogenated rosin soap show a quality advantage, i.e., better tack.
X-270-GR-S Latex	Firestone, Akron	6/14/46	Formulation similar to GR-S-X-231; 50-55% total solids, no antioxidant, contains non-staining shortstop, tuads, manufactured in large-scale batches.	
X-274-GR-S	National Synthetic, Louisville	6/28/46	GR-S-10 shortstopped with sodium sulfide and stabilized with Stalite.	For same purpose use as GR-S-10. Produced for materials where a special non-discoloring antioxidant is required.
X-276-GR-S Latex	Goodyear, Akron	6/14/46	Low rosin soap, GR-S latex with a high solids content of 58%.	General-purpose use.
X-273-GR-S	U. S. Rubber, Institute	11/14/45	GR-S-10 shortstopped with sodium sulfide and stabilized with 1.5 parts EFED; salt-acid coagulated.	Produced for materials where a special non-discoloring antioxidant is required.
X-278-GR-S	U. S. Rubber, Naugatuck	7/16/46	50/50 butadiene/styrene ratio sodium oleate and glue emulsifiers, shortstopped with hydroquinone; two parts PBNA antioxidant, alum coagulated.	Use in closure and sealant compounds.
X-292-GR-S	U. S. Rubber, Institute	7/12/46	Masterbatch containing 100 parts Buca A clay and 100 parts of a GR-S-type polymer made with sodium sulfide shortstopper, 40 Mooney viscosity, 1.5 parts EFED.	Clay masterbatches are reported to have superior processing and handling characteristics. For use in stocks requiring this type of material.
X-222-GR-S	Firestone, Akron	8/9/46	Alum coagulated GR-S made with dehydrogenated rosin soap.	Polymers made with dehydrogenated rosin soap show a quality advantage, i.e., better tack.

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description	Special Characteristics
X-272-GR-S	U. S. Rubber, Institute	7/29/46	Rosin soap GR-S made to high conversion, and stabilized with one part Stalite; 95-105 Mooney; acid coagulated.	This rubber has good adhesiveness and cohesiveness imparted to it by its high Mooney viscosity and the use of rosin soap, thereby making it useful in adhesives and footwear stocks.
X-273-GR-S	U. S. Rubber, Institute	7/29/46	GR-S-10 shortstopped with sodium sulfide and stabilized with 1.5 parts EFED; salt-acid coagulated.	Produced for materials where a special non-discoloring antioxidant is required.
X-274-GR-S	National Synthetic, Louisville	8/5/46	GR-S-10 shortstopped with sodium sulfide and stabilized with Stalite.	For same purpose use as GR-S-10. Produced for materials where a special non-discoloring antioxidant is required.
X-285-GR-S	U. S. Rubber, Naugatuck	7/29/46	Butadiene/styrene polymer with an auxiliary chemical to produce high gel content in the polymer, shortstopped with hydroquinone and stabilized with 1.5 parts BLE; salt acid flocculated; 60 Mooney viscosity.	This material should show superior processing and very low shrinkage characteristics. For use in footwear stocks, wire insulation, extruded mechanical goods, and other type of product where these characteristics are desired.
X-292-GR-S	U. S. Rubber, Institute	7/29/46	Masterbatch containing 100 parts Buca A clay and 100 parts of a GR-S type of polymer made with sodium sulfide shortstopper, 40 Mooney viscosity, 1.5 parts EFED.	Clay masterbatches are reported to have superior processing and handling characteristics. For use in stocks requiring this type of material.
X-305-GR-S	U. S. Rubber, Institute	7/29/46	Regular GR-S except MTM modifier is used in place of DDM.	This polymer being made and tested in view of the possible future shortage of DDM.
X-307-GR-S	Goodrich, Port Neches	7/26/46	GR-S-10 except that MTM modifier is used in place of DDM.	This polymer being made and tested in view of the possible future shortage of DDM.

Wartime Allocations of Chemicals Reported by CPA

Chemical	Totals and End Uses	Quantity, Pounds	% of Total
Dimethyl phthalate	Total allocations	30,045,000	100.0
	Plastics	595,000	2.0
Phthalate plasticizers (excluding diethyl, dimethyl, and dibutyl)	Total allocations	20,029,000	100.0
	Synthetic rubber	637,000	3.2
	Plastics	574,000	2.9
	Adhesives	268,000	1.3
Carbon tetrachloride	Total allocations	223,092,000	100.0
	Synthetic rubber	3,366,000	1.5
	Total allocations	78,108,000	100.0
Dibutyl phthalate	Synthetic rubber	4,698,000	6.0
	Plastics	2,877,000	3.7
	Adhesives	933,000	1.2

STATISTICS on wartime allocations of various chemicals have been reported by the CPA Chemical Division and are give above. Quantities shown are in pounds. Allocations of dimethyl phthalate and for phthalate plasticizers (excluding diethyl, dimethyl, and dibutyl phthalate) are for the calendar year 1944. Statistics on allocations of carbon tetrachloride and dibutyl phthalate cover the periods from July 1, 1944, to June 30, 1945, and January 1, 1944, to June 30, 1945, respectively. The data presented show wartime distribution with allocations permitted only for identifiable military uses and other essential requirements. It should be noted that quantities given vary indeterminately from actual consumption.

Talks on Textile Research

F. KENNETH BRASTED, of The Rubber Manufacturers Association, New York, discussed "The Opportunities for Research in the Textile Field" on J. W. Valentine's radio program, "Textile Topics," broadcast over stations throughout the South during the week of August 29. In his talk Mr. Brasted explained the vital importance of research to the textile industry and to the rubber manufacturers who represent one of cotton's greatest industrial consumers. The speaker pointed out that, in this day of keen competition, active research is essential in determining the best product available.

Flory Heads Akron Section

PAUL J. FLORY, head of the research department of the Goodyear Tire & Rubber Co., has been elected chairman of the Akron Section of the American Chemical Society, succeeding B. S. Garvey, Jr., research chemist of The B. F. Goodrich Co. Other officers of the Section for 1946-47 are: vice chairman, E. B. Newton, of the Goodrich research department; secretary, R. D. Juve, of the Goodyear research department; and Treasurer, H. A. Pace, also of Goodyear.

Paul J. Flory

Dr. Flory, born in Sterling, Ill., on June 19, 1910 received a B.S. degree in 1931 from Manchester College, and M.S. and Ph.D. degrees from Ohio State University. Employed as a research chemist at the Du Pont Experimental Station in 1934, Dr. Flory became interested in the polymer field. In 1938 he joined the basic science laboratory of the University of Cincinnati as a research associate, and from 1940 to 1943 was a research chemist with Standard Oil Development Co. He has been in charge of fundamental research at the Goodyear Research Laboratory since 1943.

Awarded the Sullivant Medal of Ohio State University in 1945, Dr. Flory is the author of numerous articles on various phases of high polymers, including the mechanism of polymerization, molecular weights and constitution of high polymers, relations between physical properties and structure, and the applications of statistics to high polymer problems.

A. P. S. High-Polymer Physics Division Meeting

AN ANNOUNCEMENT from the Division of High-Polymer Physics of the American Physical Society reports that this Division will meet with the Fiber Society in Charlottesville, Va., on September 26, 27, and 28 in a joint symposium on textiles and fibers. The program committee for this meeting is composed of Wayne A. Sisson, American Viscose Co., as chairman; S. L. Silverman, Johns Hopkins University; J. W. Liska, Firestone Tire & Rubber Co.; and J. W. Beams, University of Virginia.

Local arrangements at Charlottesville are under the charge of Lewis Larrick, of the Institute of Textile Technology at Charlottesville. Admittance to the sessions will be limited to members of the Fiber Society, its certified guests, and members and associate members of the Division of High-Polymer Physics.

Plastics Technology

Plastics Mold Release[1]

Earl E. Ziegler[2]

THE layman, uninitiated in the ways of plastics fabrication, might possibly picture in his imagination shiny, streamlined molding machines automatically transforming granular raw materials into finished plastic products, ready for immediate sale. The fabricator, however, knows from actual and sometimes bitter experience that the process is not that simple, that many problems must be overcome during the transformation of granules into finished plastic products. He knows that the opposing tendencies of molding materials and molding machines must be carefully balanced against each other if the best finished products are to be obtained. He is seldom in a position, however, to undertake the extensive research work necessary to discover the underlying principles of plastics behavior.

As a matter of fact, the fabricators are not interested in the discovery of principles *unless* practical methods for their control lead directly to easier fabrication. The laymen, or ultimate consumers, are interested only if more satisfactory finished products result. The research work about to be described was initiated with the interests of both groups in mind.

Mold release was chosen for this study with the knowledge that it is just one of the many problems which necessarily confront the fabricators in any young industry. That very serious difficulties can be encountered with mold release was brought out forcibly by experiences during the war. Scratched, galled, or broken parts were frequently the result of the refusal of some plastic to release easily from molds having small draft angles, long draws, or intricate internal construction.

The tests about to be described were conducted, for the most part, on polystyrene, not because it was unique among plastics in presenting mold release problems, but because it was available in sufficient quantities and was uniform in behavior. The investigation was extended to cover mainly other plastics, however, and, unless otherwise noted, the conclusions presented here apply to thermoplastics in general.

Before the investigational work on mold release could be started it was necessary to devise a test as sensitive as possible to slight changes in molding conditions and yet reproducible enough to insure accurate data from several technicians without burdensome cross-checking. Various test methods were attempted, and several different sizes and shapes of test specimens were tried before satisfactory results were obtained. Thereafter it was necessary to establish and maintain rigid cleaning, molding, and testing procedures.

Mold Release Test

Briefly stated, our mold release test consists of (1) cleaning the metallic test specimen very thoroughly, (2) compression molding the thermoplastic to be tested around the specimen, and (3) measuring the force necessary to pull the specimen out of the molded plastic.

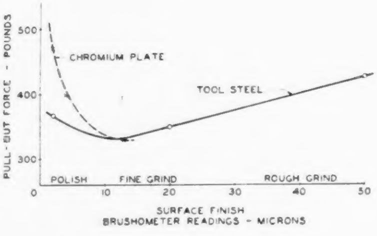


Fig. 1. Effect of Surface Finish—All Draft Angles, Three Degrees

The test specimen is in the form of a slightly tapered plug one inch in diameter, 3/8-inch thick, with a blind tapped hole in the back. The clean specimen is placed into a full positive compression mold with the tapped hole down against the bottom platen. It is then covered with plastic granules which are molded into a solid plate ½-inch thick. This plate is cut down in size to three inches square with the plug located exactly in the center. During the tensile test the molded plastic plate is held in a clamp while a threaded rod, screwed into the plug's tapped hole, is loaded on an inclined plane test machine at a constant rate. An autographic pen records the pounds pull necessary to release the plug from the plastic in which it was embedded.

To illustrate the sensitivity of this test, consider the following experience. Four test specimens were very carefully washed in solvents, were completely dried, and were molded in crystal-clear polystyrene according to the standard procedure without ever being touched by hand. The average pull-out force for these four specimens was 475 pounds.

The same specimens were washed again and were completely dried. This time, however, they were handled directly by hand, that is, without the protective cleansing tissues ordinarily used. In fact, all four pieces were deliberately handled more than was necessary, preparatory to the molding operation. Clear polystyrene was again molded by the standard procedure. This time the average pull-out force for the same four specimens was only 310 pounds. As far as is known, this drop of 35% was caused solely by the presence on each specimen of a very thin film of "lubricant" resulting from direct contact with the operator's hands.

This illustration serves to emphasize the great care which must be taken if consistent test results are to be obtained. It also proves the effectiveness of a commonly used trick of injection molding, that of the machine operator rubbing his hand over that portion of the mold where the plastic tends to stick.

Results of the testing done to date indicate the reproducibility to be entirely satisfactory. Table 1 shows the pull-out force in pounds for four series of moldings on clear polystyrene. Because of its uniformity and availability, this clear molding material was chosen as a "standard" to which various special formulations and other thermoplastics could be compared, and a standard to which the metal specimens had to return after they had been contaminated by plasticizers and lubricants.

TABLE 1. "STANDARD" POLYSTYRENE MOLD RELEASE VALUES

Specimen Number	Pull-Out Force*—Pounds: Original 11-9-44	First Check, 11-27-44 After 40 Moldings on Each Specimen	Second Check, 12-26-44 After 107 Moldings on Each Specimen	Third Check, 2-19-45 After 384 Moldings on Each Specimen
6	430	425	420	415
10	360	345	340	345
12	365	360	375	370
14	400	410	410	415

*Each value shown in this and all other tables in this report represents the average of at least five separate determinations.

Compression molding from granules was chosen for this test after careful consideration of the several methods available. It can easily be seen that this is a test wherein the tendency of a plastic to stick to a metal surface is magnified greatly. The viscous fluid plastic is forced into every surface scratch and machine tool mark on the metal specimen during the molding process. Upon cooling, each of these irregularities is held all the more tightly against the metal surface by the shrink fit which exists. This tight shrink fit is caused by the difference in coefficients of expansion between the metal test piece and the plastic. During the tensile test, therefore, the metal specimen is held very rigidly by the surrounding plastic up to a certain point at which the resistance to the specimen's movement within the plastic walls is overcome, and it is removed very suddenly. It is this "pull-out force" which is recorded.

The correlation between this compression molding test and actual injection molding practice is excellent, as will be illustrated at the end of this discussion.

Mold Surface Finish

For evaluating the effect of surface finish on mold release, several tool steel specimens were made up, identical in every way except finish. A rough grind, and a fine polish were included in the first group tested.

The curves in Figure 1 show that, contrary to popular opinion, the most highly polished surface is not necessarily the best for mold release. Actually, a fine grind seems superior to either a rough grind or a high polish in this regard.

In order to substantiate this strange and unexpected result, several extra test specimens were prepared. Three tool steel specimens were machined, polished, and chromium plated for the first set; the first was left with a matte finish appreciably rougher than the second, which was polished by conventional methods. The third was plated and buffed by a special process which gave a very highly polished mirror finish. Figure 1 shows that the matte finish of 13 microns released at 330 pounds; whereas it was necessary to exert 400 pounds pull to release the polish of four microns and 470 pounds to release the mirror finish of two microns.

The second set consisted of four cold-rolled steel specimens all originally highly polished. The first was left in its original state; the second was chromium plated to a matte finish, and the third and fourth were chromium plated and

[1] Presented before Rubber & Plastics Division, A.S.M.E., Detroit, Mich., June 20, 1946.
[2] Dow Chemical Co., Midland, Mich.

repolished. The results are shown in Table 2.

Table 2. Effect of Surface Finish

Cold-Rolled Steel — Draft Angle—3 Deg.

Specimen Number	Plating	Finish	Pull-Out Force (Clear Polystyrene)
29	None	Polish	360
30	Chromium	Matte	315
31	Chromium	Polish	420
32	Chromium	Polish	410

Here again, the rougher matte-finished specimen pulled out more easily than the other two plated with the same metal, but brought to a high polish. Certainly the most highly polished surface is not the best for mold release.

Two possible explanations for this phenomenon present themselves. The first has to do with the polishing operation. A finish grind on the side of a test specimen (or mold, for that matter) would have very small peaks and valleys on an essentially flat or straight-line surface. The polishing operation would eliminate the sharp peaks, but it might introduce a gently rolling surface which would appear to the naked eye to be very smooth .Even the Brushometer might not detect the gross irregularities which could exist on a polished surface in the form of gentle rolls. It is conceivable that slight reentrant angles might exist unknowingly on polished surfaces with small draft angles, thereby making mold release more difficult.

The second explanation is connected with the possibility that the molded polymer might not release all at once from the entire fine-ground surface. It might be that the small projections of polymer, extending into the grinding marks in the mold, shear off or deform first nearest the outer edge of the molding, thereby progressively increasing the unit load on the remaining area until the molding finally releases. This point is more clearly illustrated by the well-known trick of tearing a big-city telephone directory in two. The novice, simply exerting his strength to rip all the pages at once, fails miserably. The expert, who first kinks the book slightly, succeeds with apparent ease by actually tearing one page at a time.

Mold Metal

An effort was made to determine whether the mold metal itself affected mold release. To do this one set of rough ground specimens and another set of polished specimens were made up, each set identical in every respect except the metal used. Table 3 outlines the results obtained on both sets.

Table 3. Effect of Mold Metal

Draft Angle—Three Degrees

Specimen Number	Metal	Finish	Pull-Out Force in Pounds Clear Polystyrene
2	Cast Iron	Rough Grind	330
4	Cold-Rolled	Rough Grind	400
6	Tool Steel	Rough Grind	425
8	Dowmetal	High Polish	285
16	Sint. Cast Iron	High Polish	325
10	Stainless Steel	High Polish	345
12	Tool Steel	High Polish	360
29	Cold-Rolled	High Polish	360
14	Chromium Plate	High Polish	410
31	Chromium Plate	High Polish	420
32	Chromium Plate	High Polish	410
39	Mirror Chromium Plate	Very High Polish	450
40	Mirror Chromium Plate	Very High Polish	470

There are several important conclusions which can be drawn from the work done on mold metals and from the condensed data presented in Table 3. The first is that those metals known to possess a somewhat porous structure have better mold release properties than those known to be dense. The cast-iron specimen pulled more easily than either the cold rolled or tool steel specimens of the same rough-ground finish. The highly polished Dowmetal and sintered iron specimens pulled more easily than any of the dense metal pieces similarly polished.

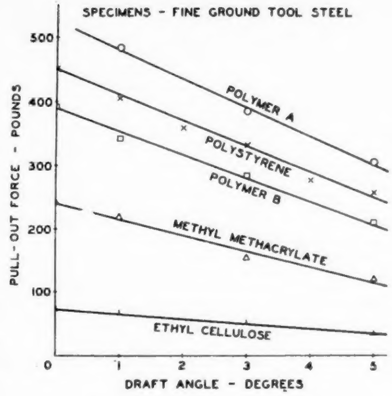


Fig. 2. Effect of Draft Angle

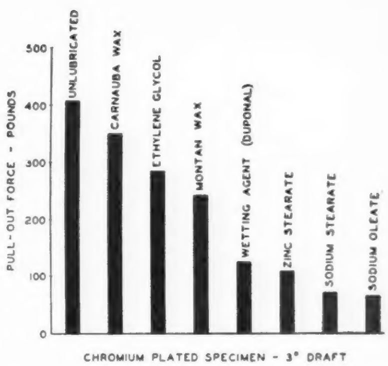


Fig. 3. Effect of Mold Lubricants

The correlation between the mold-surface - finish conclusion previously drawn and this one on porous metals should be noted. Regardless of the appearance of the polished metal to the naked eye, a porous metal must have a rougher surface than a dense metal. Apparently the phenomenon of improved mold release is the same, no matter whether the plastic penetrates into the very small tool marks of a fine grind or into the minute pores of certain metals. A slightly roughened mold surface facilitates plastic mold release.

The second conclusion to be drawn is that, among all the highly polished dense metals tested, stainless steel has the best mold release properties, chromium plate the worst. Experimental test data show that chromium plate is inferior to tool steel or cold-rolled steel of similar finish (Figure 1 and Table 2), and that the smoother and more highly polished mirror chromium plate is inferior to conventionally applied chromium plate (Table 3).

It should be emphasized that these statements are made only after very careful checking and rechecking of all experimental data on polystyrene and many other thermoplastics, and that they refer only to mold release. Other good and sufficient reasons still exist for finishing many plastics molds with chromium plate.

The third conclusion is that the lower the coefficient of thermal expansion of the mold metal, the easier a male molding will release. This and the converse are obvious and explain to some extent why the Dowmetal and stainless steel specimens have an advantage over the other highly polished test pieces.

Mold Draft Angle

Draft angles[3] of zero through five degrees in one-degree increments, were ground on a special set of tool steel specimens. The results, plotted in Figure 2, show that straight-line functions exist between the two extremes tested. They also indicate that extrapolations of these lines would intersect the horizontal axis between 10 and 11 degrees. Theoretically, therefore, all of the thermoplastics tested would release without effort from a mold having a draft angle of eleven degrees.

It is somewhat surprising to learn that a draft angle of one degree or two degrees is not very much better than no angle at all. However it is not difficult to rationalize on this straight-line plot, once the fact is established. A greatly magnified cross-section of the metal specimen's tapered side would reveal a veritable saw-tooth design wherein many projections of plastic would extend into matching depressions in the metal. When either one is forcibly removed from the other by a sliding action, either the plastic projections are sheared off completely, or they deform in order to get out of the depressions in the metal. Apparently is makes little difference to the larger plastic projections whether a draft angle of zero or one degree exists; they have to shear off in either case. Only the small projections are benefited when the draft angle increases from zero to one degree. But, as the draft angle continues to increase, progressively larger projections are benefited, and we have the straight-line functions shown in Figure 2.

Mold Lubrication

The compatibility of a mold lubricant with the molding material is an important factor, particularly in the case of crystal-clear polymers where slight incompatibility is immediately evident. Experience has shown that some lubricants satisfactory for injection molding may or may not be satisfactory for compression molding where static conditions exist and plastic flow is minimized. Some lubricants, used successfully in compression molding a particular polymer, may be unsuited for use with another polymer because of incompatibility.

The fact that volumes could be written on mold lubrication goes almost without saying. In fact, to cover a small portion of the subject such as the effectiveness of available lubricants on moldings of commercially available plastics would take more time and space than are available. The discussion here will be limited, therefore, to the effectiveness, on polystyrene only, of those lubricants which in no way detract from its crystal clarity when compression molded.

More than 20 mold lubricants were tested for effectiveness on polystyrene In each case the lubricant was applied

[3] The degree of the taper of the sidewall of a mold or the angle of clearance designed to aid removal of parts from a mold.

directly to the metal specimens, and the clear polymer was then compression molded around them. In order to evaluate the lubricants as fairly as possible, the amount applied to each specimen was such that the finished molding had a minimum of haze. Most of the lubricants tested in this manner were rated "hazy" or "slightly hazy." Only seven were rated "clear." The effectiveness of these seven mold lubricants on chromium plated test specimens is shown in Figure 3.

It should be pointed out that most of the lubricants rated "slightly hazy," and many of those rated "hazy" have been and are being used successfully on experimental injection molding of clear as well as colored polymer. Outstanding in the latter group are some members of the Silicone family which caused several of the test specimens so treated to fall out of their moldings.

The work done to date shows that the effectiveness of a lubricant cannot be judged by "feel" alone. Outstanding examples of this are powdered mica and graphite, both of which feel exceedingly slippery to the human hand, but which are decidedly inferior to many of the powdered mold lubricants commonly used, such as zinc and sodium stearate.

Finally, the effectiveness of a lubricant in a polymer cannot always be prophesied by the effectiveness of that same lubricant used directly on the mold. Typifying this is zinc stearate which, applied directly to the chromium plated specimen, reduced the pull-out force by approximately 70%, but which, contained within the polymer nearly to the limit of its compatibility, reduced the force by only 25%.

Molding Conditions

The effect on mold release of variations in molding temperature and pressure was found to be related to the internal strain pattern of the molded polymer. A decrease in molding temperature or pressure facilitated release to some extent. An increase in pressure or temperature impaired mold release noticeably. The visual changes in strain pattern, as seen in crossed polaroids, and the corresponding changes in mold release were much better defined for extremes of temperature than of pressure.

The importance of temperature of the finished molding at the time of release was investigated with the aid of a special oven mounted on the tensile test machine. Standard moldings were made in the usual manner, but instead of holding them at standard temperature while the metal specimens were pulled out, these moldings were tested at temperatures were tested at temperatures up through 185° F. The great improvement in release (of a female molding) which accompanies an increase in release temperature is shown graphically in Figure 4.

TABLE 4. EFFECT OF PLASTICIZERS AND LUBRICANTS

Specimen Number	Metal	Draft Angle Degrees	Finish	Pull-Out Force - Pounds: Clear Polystyrene	Plasticized	Lubricated
10	Stainless Steel	3	Polish	350	320	150
12	Tool Steel	3	Polish	340	305	165
14	Chromium Plate	3	Polish	390	345	190
18	Tool Steel	0	Fine Grind	450	390	320
24	Tool Steel	3	Fine Grind	315	285	245
28	Tool Steel	5	Fine Grind	245	210	150
6	Tool Steel	3	Rough Grind	430	340	355

Addition Agents

It seems safe to say that the beneficial effect of coloring agents on mold release has not been fully appreciated in the past. As a matter of record, every single colored polymer tested for mold release to date has proved superior to uncolored polymer of the same type. The amount of improvement depends as much on the type of dye or pigment as on the amount. The remarkable fact is that as little as 0.01% of some coloring agents improves mold release noticeably.

The addition of plasticizers or lubricants to virgin polymers for the purpose of improving their molding characteristics or mold release properties is a very involved subject. The chemical types of plasticizers and lubricants and their possible methods of addition will be omitted here in favor of their results on the polymer's mold release. Table 4 summarizes this information.

It is apparent that plasticized polymer is somewhat more effective in improving mold release on rough than on smooth surfaces. The data in Table 4 indicate an average reduction in pull-out force of 10% for the polished specimens, 12% for those which were fine-ground, and 21% for the rough-ground piece.

It should be noted that the lubricated material is by far the most effective on the smooth surfaces. The data show an average reduction of 52% on the polished test pieces, 29% on the fine-ground pieces, and 17% on the rough-ground specimen.

The practical significance of this is obvious. A plastics fabricator, experiencing trouble with mold release on virgin polymer, should try a plasticized polymer if his mold is rough or worn from long use. If his mold is in excellent condition, however, his chances for any great improvement would lie in a lubricated polymer.

Competitive Thermoplastics

Eight commercially available thermoplastic materials were tested for mold release by the standard procedure for the sole purpose of providing comparative data. The amount or type of coloring agent, plasticizer, lubricant, or filler was not determned. In each case sound, bubble-free moldings were made around chromium-plated test specimens and were tested at constant temperature in the usual manner. See Figure 5.

Summary

A new test has been developed for the evaluation of plastics mold release. Briefly, it consists of compression molding the thermoplastic to be tested around metallic test specimens, and then measuring the force necessary to pull the specimens out.

As a result of the work done with this test, the following conclusions have been reached:

1. MOLD SURFACE FINISH. The most highly polished surface is not necessarily the best for mold release. A fine grind or a matte finish seems superior.
2. MOLD METAL. Metals having a somewhat porous internal structure have better mold release properties than dense metals. Among the dense metals, stainless steel has the best mold release, chromium plate the worst. The higher the mold metal's coefficient of thermal expansion, the easier a female molding will release.
3. MOLD DRAFT ANGLE. Apparently, a straight-line function of mold release *vs.* draft angle exists between zero and five degrees.
4. MOLD LUBRICATION. Seven lubricants, particularly recommended for use on crystal-clear polystyrene, reduce the pull-out force by as much as 80%. Outstanding for general injection molding are liquid Silicones.
5. MOLDING CONDITIONS. Changes in molding conditions, which result in decreased internal strain in the molding, improve release noticeably.
6. ADDITION AGENTS. Every colored polymer tested for mold release to date has proved superior to uncolored polymer of the same type. Plasticizers are effective in improving release from rough surfaces. Lubricants within the polymer are much more effective on smooth or polished mold surfaces.
7. COMPETITIVE THERMOPLASTICS. The mold release abilities of several commercial thermoplastics are plotted in Figure 4.

Conclusion

If, as is often said, the proof of a pudding is in the eating, then the proof of this mold release work would be the

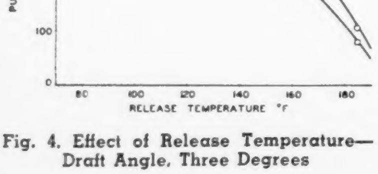


Fig. 4. Effect of Release Temperature—Draft Angle, Three Degrees

Fig. 5. Competitive Thermoplastics

actual use of a mold designed according to the conclusions set forth.

With this in mind, a four-cavity injection "Chip Mold" was designed, built, and used to make several thousand moldings. The metal chosen for the mold cavities was porous, sintered iron.[4] It was neither polished nor plated, just left with a matte finish. Draft angles of three degrees were used throughout. No knockout pins were included in the final assembly, only a sprue puller.

Clear polystyrene was tried first in this experimental mold. Given the proper molding pressure, temperature and cycle, satisfactory moldings could be made which released nicely. At the same time, operating conditions on the molding machine could be set so as to make all four moldings stick badly.

The use of plasticized and lubricated polystyrene improved mold release noticeably and made it still more difficult for the moldings to stick.

Finally, sticking was made virtually impossible by the impregnation of the porous metal cavities with a good liquid mold lubricant.

This experimental mold proved doubly profitable when it was discovered that the lubricant, absorbed in quantity by the porous metal, actually facilitated the release of a great number of moldings before reapplication was necessary.

In closing, it should be repeated that mold release is but one of many problems facing plastics fabricators. Research staffs around the country are working on a great many other problems connected with this young, but rapidly expanding plastics industry. It is hoped that this minor contribution on mold release will add to the growing list of problems solved and will hasten the realization of the layman's dream wherein the entrance of plastic granules into a molding machine is closely followed by the emergence therefrom of beautifully finished plastic parts ready for the market.

[4] Made with the cooperation of United States Graphite Co., Saginaw, Mich.

Low-Pressure Plastics Show

INDUSTRIALISTS of the low-pressure division of The Society of the Plastics Industry will hold their second conference and exhibit at the Edgewater Beach Hotel, Chicago, Ill., from January 23 through 26, 1947. This is distinct from the National Plastics Exposition to be held beginning May 5, also in Chicago. The decision to hold this second conference was made in view of the many new developments in materials, products, and processes in the low-pressure field. The Division plans to pattern this second convention along lines followed at the first meeting, held in Chicago in 1946. A symposium of technical papers will be held on January 23 and 24. From January 23 to 26 there will be on exhibit large contoured products now being made under low-pressure methods, such as boat-hulls, plane fuselage sections, luggage, panelling, prefabricated house sections, and other reinforced products.

J. E. Stokes of Bakelite Corp., chairman of the low-pressure industries division steering committee, has announced that Robert J. Brinkema, of Egmont Arens, will be conference chairman. Mr. Brinkema will be assisted by the following committee heads: Cecil Armstrong, Armstrong Plastics Co., and Paul R. Hoffman, U. S. Plywood Corp., co-chairmen of the publicity committee; T. W. Noble, Fabricon Products, Inc., chairman of the program committee; and Lawrence J. Marhoefer, chairman of the exhibit committee.

Shipments and Consumption of Plastics and Resins

THE following statistics represent the shipments and consumption, in pounds, of plastics and synthetic resins for the second quarter of 1946, as reported to the Bureau of the Census, United States Department of Commerce, by 77 manufacturing companies and company departments. Data for synthetic resins for protective coatings are not included.

	April	May	June
Cellulose acetate and mixed ester plastics *	9,041,752	8,894,870	8,569,138
Nitrocellulose plastics *	1,713,961	1,532,407	1,429,049
Phenolic and other tar acid resins			
Laminating (dry basis)	2,404,966	1,809,303	2,573,412
Adhesives (dry basis)	1,258,188	1,317,144	966,569
Molding materials *	12,483,690	13,453,292	14,161,634
All other (dry basis)	5,314,081	5,437,693	4,818,844
	21,460,925	22,017,432	22,550,459
Urea and melamine resins			
Adhesives (dry basis)	3,314,027	3,477,628	2,596,207
Textile and paper treating (dry basis)	1,012,742	890,270	886,620
All other (dry basis)	186,583	262,132	145,115
	4,513,352	4,630,030	3,627,942
Polystyrene *	4,950,626	5,159,798	5,639,484
Vinyl resins			
Sheeting and film *	2,243,370	2,375,298	1,857,160
Textile and paper coating (resin content)	1,436,258	1,397,337	1,234,522
Molding and extrusion (resin content)	5,265,325	4,665,924	4,978,168
Adhesives and all other (resin content) †	1,804,105	2,187,521	2,369,412
	10,749,058	10,626,080	10,439,262
Miscellaneous plastics and resins * ‡	8,500,565	8,374,686	7,041,796
TOTALS	60,930,239	61,235,303	59,297,130

* Includes fillers, plasticizers, and extenders.
† Proportion of estimate, 2.8% or less.
‡ Includes data for ethyl cellulose, urea and melamine, acrylic acid, petroleum resins, ester resins mixtures, and other synthetic resins.

1945 Consumption of Talc, Pyrophyllite, Ground Soapstone

MIXED production of talc, prophyllite, and ground soapstone in 1945 continued its decline from the high levels of 1943, according to the Bureau of Mines, United States Department of the Interior. Sales of the materials increased slightly in quantity, but declined in value from 1944 levels. Total mined in 1945 was 401,217 short tons, of which 361,749 short tons were used by producers, as compared with 1944 figures of 418,228 and 353,209 short tons, respectively. Some 401,080 short tons were sold in 1945; while 398,863 short tons had been sold in 1944. Imports for consumption in 1945 totaled 6,699 short tons, against 8,478 short tons in 1944. Exports of talc, steatite, soapstone, and pyrophyllite, both crude and ground (excluding powder talcum), were 11,141 short tons in 1945 and 10,709 short tons in 1944.

Seven industries—paint, ceramics, rubber, roofing, paper, toilet preparations, and insecticides—consumed 79% of the domestic sales of these products in 1945. Increases were reported in sales to the ceramic, rubber, roofing, toilet preparations, and insecticide industries, with especially noticeable increases for those in the rubber and the insecticide industries Last year 62,049 short tons, or 15% of total sales, were sold to the rubber industry; while 51,833 short tons, or 13%, had been sold in 1944.

Demonstrate Fire Fighting At Dayton Rubber

THE latest techniques in fighting industrial fires were demonstrated before more than 375 members of the Ohio State Firemen's Association assembled at the Dayton Rubber Mfg. Co. plant in Dayton. The prize-winning Dayton Rubber fire brigade demonstrated various methods using chemicals, foam, and water to extinguish blazes most commonly found in rubber manufacturing factories. Various chemicals were ignited in specially prepared tanks, and the proper techniques were then used to prevent spreading or flash-back of such types of fires.

Newest equipment of the Dayton Fire Department was also demonstrated under the direction of Fire Chief Joseph Kirby and District Chief Forest Lucas. Conditions found in factories were reproduced in a specially prepared demonstration area within the company's grounds to create an obstacle course for the fire brigades. Onlookers were kept informed on the progress of events by a running technical description broadcast by Capt. E. R. Bridewell, of the Dayton Fire Department, over the public address system. More than 50 cities and villages in the state were represented by their fire chiefs and firemen, assembled at this eighth annual convention of the firemen's association, who were taken on a tour of the Dayton Rubber plant at the close of the demonstration period.

RUBBER WORLD
NEWS of the MONTH

Highlights—

Rubber industry and government leaders expressed continued optimism with regard to a high demand for rubber products through 1947, but actual production during June, July, and August receded somewhat from the peak rate of May. Vacation shutdowns and some strike difficulties accounted for most of the decline, with raw and component material supply difficulties being responsible for the remainder. The British Rubber Growers' Association urged the early return of a free rubber market and agreement with this proposal was voiced in the United States by several large rubber goods manufacturing company heads. No decision on any change in price of the cost of natural rubber to manufacturers was announced by RFC up to almost the end of August. Although there were some strikes and threats of strikes in the industry in connection with the signing of new contracts, local unions at the Firestone and Goodrich plants in Akron accepted new contracts and local unions of these and other companies elsewhere were expected to follow suit if they had not already done so. The strikes at the three plants of The General Tire & Rubber Co. were all settled during August.

Seasonal Lull and Strikes Drop Production Somewhat; Free Rubber Market Urged

There has been some decline in the production of rubber goods during the past two or three months, starting in June and continuing during July and August. Most of this could be attributed to the regular seasonal lull, plant shutdowns for vacations, etc., but in addition the strike at the three General Tire & Rubber Co. plants further reduced overall output. From both sides of the Atlantic, by virtue of a statement by F. D. Ascoli, chairman of the British Rubber Growers Association, and in this country because of a statement by John L. Collyer, president of The B. F. Goodrich Co., there was a growing demand for the return to a free rubber market. In spite of the statement in the letter of July 26 to the rubber manufacturing industry by the Office of Rubber Reserve that a decision on the price of natural rubber would be made in about ten days, no decision had been announced late in August.

Record Production Rate Declines

Although annual consumption of rubber in the United States approached the million-ton mark in 1946 for the first time in history, vacation shutdowns and strikes reduced this high rate of rubber consumption during July and August. The Rubber Manufacturers Association, Inc., disclosed on August 6 that consumption of rubber in this country during the first six months of 1946 totaled 493,261 long tons. A. L. Viles, RMA president, noted that consumption of rubber for the first half of the current year topped figures for any comparable period even during the war years.

The Association made public the following figures on first half consumption as follows: GR-S, 344,962 tons; GR-M, 19,982 tons; GR-I, 41,406 tons; and Nitrile-type rubbers, 2,389 tons. Natural rubber consumption was 84,522 tons, and a total of 130,918 tons of reclaimed rubber was used during this period.

However these figures would have been even higher if the peak rubber consumption rate reached in May had been maintained in June. Total consumption of synthetic rubbers dropped from about 71,000 tons in May to a little over 62,000 tons in June, and the total consumption of natural and synthetic rubbers for June was about 78,600 tons, as compared with 88,800 tons in May. Since exports of rubber from this country and stockpiling do not account for the difference in consumption between the two months, a lower production rate seems confirmed. It is understood that the lower production rate continued during July and August.

Tire production figures for June and the first half of 1946 were reported by the RMA on August 25. A production of 38,439,843 truck, bus, and passenger-car-tires for the first six months of 1946 was recorded. This included 30,737,117 passenger-car tires and 7,702,726 truck and bus tires. Production of passenger-car tires during June was given as 4,921,297 units, as compared with 5,700,306 units in May, a drop of 13.7%. Production of truck and bus tires was 1,114,797 units, against 1,306,482 in May, a drop of 18%. (See table below.)

W. J. Sears, director of the CPA's Rubber Division, on August 9 reported a production of 16,191,000 passenger-car and motorcycle tires during the second quarter of 1946, a 10.5% increase over first-quarter production. Truck and bus tire production during the second quarter was reported as 3,845,000, bringing the total for the first six months to 7,705,894, considerably more than half of the entire year's goal of 13,860,000 units and leaving only 6,155,000 to be made in the second half of the year.

Mr. Sears said that manufacturers now are giving passenger-car and motorcycle tires the green light in an effort to meet the year's goal of 69,150,000 units. He believes this goal can be reached if there is no lengthy interruption of production during the rest of the year. Every effort will be made by the CPA's Rubber Division to distribute the supply of natural and synthetic rubber and other component materials so that the goal can be reached, he added.

ESTIMATED AUTOMOTIVE PNEUMATIC CASINGS AND TUBE SHIPMENTS, PRODUCTION, AND INVENTORY—JUNE-MAY, 1946—FIRST SIX MONTHS, 1946 AND 1945

	Original Equipment	Replacement	Export	Total Shipments	% of Change from Preceding Month	Production During Month	% of Change from Preceding Month	Inventory End of Month	% of Change from Preceding Month
Passenger Casings									
June, 1946	710,732	4,279,041	55,769	5,045,542	—11.11	4,921,297	—13.67	2,290,220	—4.03
May, 1946	894,776	4,730,347	51,137	5,676,260		5,700,306		2,386,483	
First half, 1946	3,527,878	26,517,691	275,759	30,321,328		30,737,117		2,290,220	
1945	143,923	9,800,913	99,859	10,044,695		10,048,161		994,884	
Truck and Bus Casings									
June, 1946	213,876	796,090	78,504	1,088,470	—19.73	1,114,797	—18.06	1,019,009	+2.85
May, 1946	364,411	930,446	61,201	1,356,058		1,360,482		990,759	
First half, 1946	1,541,890	5,530,506	388,336	7,460,732		7,702,726		1,019,009	
1945	3,238,626	6,757,381	96,774	10,092,751		10,118,845		737,624	
Total Casings									
June, 1946	924,608	5,075,131	134,273	6,134,012	—12.77	6,036,094	—14.51	3,309,229	—2.01
May, 1946	1,259,187	5,660,793	112,338	7,032,318		7,060,788		3,377,242	
First half, 1946	5,069,768	32,048,197	664,095	37,782,060		38,439,843		3,309,229	
1945	3,382,549	16,558,294	196,603	20,137,446		20,167,006		1,732,508	
Passenger Truck and Bus Tubes									
June, 1946	931,238	4,647,849	121,231	5,700,318	— 9.20	5,709,905	—11.65	4,376,589	+ .07
May, 1946	1,268,301	4,903,209	106,702	6,278,212		6,462,794		4,373,316	
First half, 1946	5,170,284	26,578,192	631,025	32,379,501		33,640,356		4,376,589	
1945	3,424,385	15,479,291	136,257	19,039,933		19,272,591		2,601,379	

Type of Tire (Units)	2nd Quarter 1946	1st Half 1946	4th Quarter 1945
Truck and bus	3,845,285	7,705,894	3,096,826
Tractor-implement	1,167,647	2,372,660	912,637
Passenger and motorcycle	16,191,296	30,842,101	11,144,856
Camelback (long tons)	15,803	30,508	26,999

The rate of passenger-car tire manufacture rose during the second quarter despite a decrease of 8% in June, resulting primarily from spotty supply situations in the various component materials and to loss of production during inventory checks. However indications are that July production may better June slightly, despite the Fourth of July holiday and the relatively large number of plants granting vacations at that time, Mr. Sears explained.

The table above gives production of truck and bus, tractor and implement, passenger-car and motorcycle tires and camelback for the second quarter of 1946 and the first half of the year, compared with production in the fourth quarter, 1945, the first full postwar quarter.

Two rubber company officials, James J. Newman, Goodrich vice president, and P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., in statements during August predicted a continuing high demand for tires.

Mr. Newman, using statistics on gasoline consumption for the first half of the current year of 680 gallons per passenger car for the year, pointed out that this figure is 34% more than the average for last year and tops the record figure of 667 gallons set in 1941, and he also stated that:

"This evidence of extensive driving, coupled with a better than 25% increase in cars in service that are more than two years old, means a tremendously active market for replacement tires and helps explain why they are still hard to get despite production levels exceeding any peacetime years."

There are now, he said, about 25,300,000 cars more than two years old on the roads; while in 1941 only about 20 million of the 27,600,000 registered autos were beyond the two-year mark—the age at which cars generally begin to be in the market for replacement tires.

Mr. Newman also quoted a "very conservative" projection based on data from the U. S. Bureau of Mines and Public Roads Administration, indicating 685 gallons' consumption for 1947, 709 and 727 for the following two years, and 731 in 1950, assuring "a continuing high demand for replacement tires."

Mr. Litchfield predicted that the unprecedented demand for tires which has carried this year's production of the industry to record levels will continue well through 1947. On the basis of a statistical study prepared by the Goodyear organization, the 1947 tire demand is estimated at 83 million, within 4% of this year's estimated all-time high of 86½ million.

According to this study, next year's demand will call for the production of 67 million passenger-car tires, compared with 68-million in 1946; 12 million truck tires, against 14 million this year; and four million farm tires, compared with 4½ million scheduled for production in 1946.

While the demand for replacement passenger tires should return to normal next year, the increased output of new automobiles should boost original equipment tire production from an estimated 12½ million this year to 27 million in 1947, Mr. Litchfield said. Export demand, it is estimated, will increase from 800,000 to 1,000,000 tires, and the industry should be able to restore normal inventories, building these up from 700,000 this year to five million next year.

Although tire production this year is at an all-time high, it is below the industry's present manufacturing capacity, Mr. Litchfield pointed out. Raw material shortages have prevented tire manufacturers from attaining maximum output. Natural rubber importations up to the present have been below expectations owing to the Netherlands India political situation; synthetic rubber production has been held back by the alcohol shortage, and supplies of fabric and bead wire have been insufficient to meet the requirements of tire makers. If these shortages are overcome, and labor conditions remain normal, the industry has ample plant capacity to meet all expected demands for tires, according to Mr. Litchfield.

The Rubber Manufacturers Association gave figures on veterans' employment along with its release of these tire statistics. Approximately 66,000 veterans of World War II are holding jobs in the rubber manufacturing industry a year after V-J Day, it was said.

Success of the industry's program for employment of veterans was indicated in a statement by the RMA summing up the progress of the industry up to the first anniversary of V-J Day in reconverting to peacetime production.

"While we are pleased to have been able to raise production of tires, tubes, mechanical rubber goods, footwear and hundreds of other rubber products to all-time records, the industry takes particular pride in having been able to strengthen its manufacturing organization with so great a number of veterans," Mr. Viles said.

"To a large extent our 1946 production records were made possible by the infusion of new skills and new energies into our industry through a broad program of veterans employment."

Mr. Viles pointed out that rubber manufacturers employ approximately 300,000 persons in the United States. A sample survey reflecting employment among principal manufacturers shows that the industry to date has hired an estimated 90,000 veterans, or 30% of the total payroll. Approximately 32,000 were reemployed, returning to their old jobs upon their discharge from the service. The remaining 58,000 were new employes.

By a year after V-J Day, separations had cut the total employment of veterans to its present number 66,000, or about 22% of the total payroll. All manufacturing industries, durable and non-durable, are shown in the latest report of the Bureau of Labor Statistics to have employed 17.2% veterans. The same BLS report shows separations averaging 7.1% per 100 veteran employes a month for all manufacturing, as against 6.1% per 100 monthly for the rubber manufacturing industry.

Natural Rubber Production, Imports, Price, Etc.

Reports from many sources gave repeated indication that natural rubber production was rising so rapidly that producers were becoming more and more concerned regarding the future price level. British Malaya is beginning to turn out natural rubber latex in an imposing stream, and Ceylon, which produced 70% of the world's available wartime natural rubber, contemplates "complete ruin" of its rubber industry if prices drop.

The first issue of the "Rubber Statistical Bulletin" of the London Rubber Secretariat of July, 1946, estimates that production in Malaya for April, 1946, was 19,500 tons and for the first four months of 1946, 56,000 tons. Exports from principal producing territories were at a rate of 55,000 tons a month in April. Imports into the U.S.A. jumped from about 6,000 tons in May to more than 23,000 tons in June. Imports into the United Kingdom have risen from 236 tons in January, 810 tons in February, and about 15,000 tons in March and April, to almost 35,000 tons in May.

It is also of interest to note that consumption of natural rubber latex in the United States has now reached a figure of 450 tons (dry weight) for May, 1946, about a 50% increase over the January, 1946, figure of about 300 tons.

As mentioned last month, the RFC wants to raise the price of natural rubber to manufacturers to about 26¢ a pound to make up for the increase paid to the British, French, and Dutch producers effective July 1, but industry has contended that the price should remain at 22½¢ until January 1, 1947, because the RFC is making enough on the difference between the cost of production of GR-S and the selling price of 18½¢ to more than make up the loss incurred on the resale of the 150,000 tons of natural rubber to be purchased by this country between July 1 and January 1. The decision was referred to the OWMR, and although no official announcement had been made as of August 28, it is understood that the price to manufacturers will remain at 22½¢-a-pound until January 1, 1947.

Ninth Goodrich Rubber Study

A report entitled "American-Made *vs.* Crude Rubber" and described as an appraisal of supply, progress, costs, and outlook for these two kinds of rubber at the end of the first year after V-J Day and a recommendation for giving consideration to the early establishment of free competition between them, was made by the Goodrich company, through its president, John L. Collyer, on August 14, and released as its ninth in a series of studies of the rubber position of the United States. The first of these studies was released on July 5, 1940.

The first anniversary of V-J Day represents a halfway point in the postwar transition period in world rubber affairs—a period likely to extend about two years after the day of final victory, this report said. It is appropriate to take stock of the rubber position, at this halfway mark in the transition period, and in doing so we should have well in mind certain fundamental facts regarding the world revolution in rubber, it was added. Included in these facts, it was pointed out that before the war, crude rubber was America's largest import, and obviously there are great inherent economic dislocations in the simple fact that this country is able to make, at home, the equivalent of what had been its largest import.

An appraisal of world rubber at this stage logically is in terms of supply, technical progress, costs and prices, and the coming contest between crude and American-made rubber. On the question of sup-

ESTIMATES OF RUBBER DEMANDS AND SUPPLY
(Long Tons)

World	1946	1947	1948	1940
1. Total rubber consumption requirements........	1,365,000	1,500,000	1,500,000	1,234,000
2. Crude rubber supply:				
(a) Total	600,000	850,000	1,250,000	1,390,000
(b) Less estimated working stocks and stockpiling	150,000	150,000	200,000	309,000
(c) Balance for consumption	450,000	700,000	1,050,000	1,081,000
3. Minimum consumption requirements of man-made rubbers	915,000	800,000	450,000	153,000
United States				
1. Total rubber consumption requirements........	1,000,000	900,000	800,000	651,000
2. Crude rubber supply:				
(a) Total	360,000	500,000	650,000	812,000
(b) Less estimated working stocks and stockpiling	100,000	100,000	100,000	163,500
(c) Balance for consumption	260,000	400,000	550,000	648,500
3. Minimum consumption requirements of American-made rubbers	740,000	500,000	250,000	2,500

ply, restoration of Far East rubber production has been progressing favorably although seriously hampered by political unrest in certain areas. Total shipments of crude rubber from producing areas in the year since V-J Day are estimated at 375,000 tons, 21.5% of the annual world potential crude rubber producing capacity of 1,750,000 tons. During 1946 it is estimated that crude rubber receipts by all consuming countries will total 250,000 tons in the first six months and 350,000 tons in the second six months, with the United States receiving 150,000 tons of this during the first period and 210,000 tons during the second. By the end of 1946 it is expected that the rate of shipments will have increased materially and that world rubber receipts in 1947 will total 850,000 tons. This should provide crude rubber for the United States amounting to about 500,000 tons in 1947.

The table reproduced above was given to show the Goodrich company's projected picture of rubber supply and rubber demand on a world and United States basis for the first three postwar years, in comparison with the prewar year 1940.

On technical progress, it was stated that early in this country's experience with large-scale production and use of American-made rubber it was noted that this material lacked the end-product performance qualities of crude rubber for many uses, particularly in large tonnage fields, such as tires and tubes, and products used in industrial operations and that it required more processing time, and more "reinforcement" by compounding ingredients, such as carbon black. These disadvantages are now considerably less in degree, and great progress has been and is being made in the rubber itself, in compounding and in product construction and design. It should be made clear, however, that there is still a big difference between the relative value of American-made rubber in truck or bus tires and its suitability for passenger-car tires, the report states. As of today, considering certain of these large tonnage uses as a whole, crude rubber still has the advantage of performance; yet it is apparent that the greater the premium that is demanded in the price of crude rubber over the American-made type, the more intense will be the effort to improve and use larger amounts of the latter.

Free competition between these two materials will do more than anything else to spur the research and development—of both types—to broaden their usefulness and make more and better goods available at lower costs, the report emphasizes.

■ GR-S rubber can be produced—on a 600,000 tons-a-year basis—at a plant cost of 12¢ or less a pound, and even counting in plant amortization, depreciation, distribution expense, and return on invested capital, American industry could produce up to 600,000 tons of this rubber per year for *between* 15 *and* 17¢ *a pound*.

Reviewing the price agreements with the natural producers which now have the price of this type at 23½¢ a pound, f.o.b. Far East ports, it is suggested that it will probably be well into 1947 before the overall supply situation is such that the relative worth of crude and American-made rubbers, as truly competing materials can be judged accurately.

The peoples of the world should be the ultimate beneficiaries of the war-born, large-scale competition between crude rubber and American-made rubber, and this benefit may be anticipated in the form of lower cost finished products and the wider use of rubber in many applications made possible by its low cost.

As first steps toward bringing about those benefits, the Goodrich company recommends:

(1) That serious consideration be given to returning crude rubber to a free market basis—so far as purchases by the United States or its industries are concerned—at the expiration of the present buying agreements on December 31, 1946.

(2) That the government proceed with the program recommended by the Inter-Agency Policy Committee on Rubber of selling or leasing to private industry rubber-producing facilities, with provision for safeguards necessary to insure minimum capacity and production vital to our nation's military security.

Other rubber company heads seemed willing to support the Goodrich recommendations for a free market in rubber as made by Mr. Collyer.

"It is an encouraging sign that in the not too distant future we may look forward to a free and competitive market in rubber," Harvey S. Firestone, Jr., president of the Firestone Tire & Rubber Co., said.

"In the long run we believe we can give our customers the best product at the lowest price only with a free market," Herbert E. Smith, president of the United States Rubber Co., declared.

William O'Neil, president of The General Tire & Rubber Co., even went so far as to say that he favored the British stand of a free market as of January 1, 1947.

The Ascoli Statement

In a statement from London on August 12, Mr. Ascoli said that Great Britain has stopped imports of synthetic rubber and will use nothing but natural rubber for tires after October.

"We are anxious to stand on our own feet and to ascertain the real value of natural rubber as against its new competitor, synthetic rubber," Mr. Ascoli declared.

"The growers recognize that under present conditions price control was inevitable while a shortage of rubber supplies existed in the world," he added. "But no justification for price control remains after this year, and we are anxious that, at the earliest possible date, economic freedom should be reestablished to let the price of rubber find its true level.

"Although the world consumption of rubber, natural and synthetic, will be higher than before the war, there is likely to be considerable surplus in 1947," Mr. Ascoli predicted.

"Today consumption of natural and synthetic rubber in this country alone is already practically as high as the last prewar figure, and the estimated world consumption next year is between 1,250,000 and 1,500,000 tons, as against 1,000,000 tons before the war."

Management-Labor Relations News

Despite considerable delay caused by the jockeying of local U.R.W.A. unions for the most favorable terms in their new contracts with the various companies the big local unions in Akron and elsewhere of the Firestone, General Tire, and Goodrich companies signed or were about to sign new contracts by the end of August. The strikes at the plants of The General Tire & Rubber Co. were settled with the return to work of employes at the Waco, Tex., plant on August 16, the return of employes at the Jeannette, Pa., plant on August 26, and the return of employes at the Akron plant on August 28. L. S. Buckmaster, president of the international U.R.W.A. union, was selected by C.I.O. President Philip Murray as one of the group of C.I.O. executives to confer with Secretary of Agriculture Clinton P. Anderson, in Washington on August 16 on the wage-price policy of the C.I.O.

Many New Contracts Signed

Although a strike vote was taken by the Akron local union of The B. F. Goodrich Co., on July 30, and the results were 5,148 for to 509 against strike action, and this made the fifth local union at Goodrich plants to take such a vote, it was reported from Akron late in August that the Akron Goodrich local had about reached an agreement with the company, and a new contract probably would be signed by September 1. It is expected that the other Goodrich local unions will now soon sign contracts with the company.

Local No. 7, U.R.W.A., at the Akron plant of the Firestone Tire & Rubber Co. notified the NLRB on July 29 that a dispute existed between itself and the company that was holding up the sign-

ing of a new contract, but by August 25 the local union president was reported as stating that the new contract now agreed upon was one of the best that the local union has ever had with the company.

With regard to local No. 2 at the Akron plants of the Goodyear Tire & Rubber Co., it was reported on August 23 that negotiations for a new contract, although proceeding slowly, would probably be successful.

The first break in the strikes at the three plants of General Tire came on August 16, when settlement of the strike at the Waco plant was announced. Employes at the Texas plant were granted a 14¢-an-hour increase, retroactive to March 1. The union had asked for an 18½¢ increase, and the 4½¢ difference will be negotiated upon resumption of plant operation, it was said. Workers also will receive time and one-half for holidays and Sunday work, and the company and the union agreed to a joint time study on the piece-work rates now pending in arbitration proceedings.

It was next reported that negotiation for settling the strikes at the Akron and the Jeannette plants of General Tire would begin during the latter part of August, but then on August 18, members of local No. 9, U.R.W.A., at Akron voted to reaffirm the union stand on issues involved in the strike at that plant.

However on August 26 it was reported that a company-union agreement to end the strike at the Akron plant had been reached on August 25. The Akron local president was reported as having said that he would recommend to his members that the new contract be accepted. Workers at the Jeannette plant also returned to work on August 26.

Brief strikes at the Des Moines, Iowa, plants of the Firestone Tire & Rubber Co. and the Lake Shore Tire & Rubber Co., which began on August 20, made 1,300 workers at these two plants idle. The dispute at the Firestone plant was caused by the company's refusal to dismiss an employe not connected with the local U.R.W.A. union, and the dispute at the Lake Shore plant was over pay rates for about 50 workers after a change in a production process. The 700 workers at the Firestone plant returned to work on August 22, following an agreement to negotiate their differences with the company.

C.I.O. Policy on Wages

It was reported from Washington by Ray Mitten, of the *Akron Beacon Journal*, on August 18 that the U.R.W.A. as a part of the C.I.O. had agreed to the new policy of the parent union of restraint on new wage increase demands for the time being. The policy is to concentrate, temporarily at least, on holding down living costs—with buyers' strikes, educational programs, and other devices—rather than pressing for new wage increases. Whether U.R.W.A. President L. S. Buckmaster will be able to sell the new C.I.O. policy to his local union leaders at U.R.W.A.'s own wage-price conference during its international convention in San Francisco on September 16 remains to be seen.

Mr. Buckmaster stated that he was "thoroughly in accord" with the new C.I.O. policy, but he also said he could not be certain how it will affect the rubber wage situation until after the September conference.

GR-S Inventories Limited; Other CPA Restrictions

Limitations on the delivery of GR-S which were removed shortly after V-J Day, have been replaced in order to insure equitable distribution of the present limited supply, W. James Sears, director of the Civilian Production Administration's Rubber Division, said recently. The limitation prohibits the manufacturer from accepting any deliveries of GR-S without authorization from CPA. Amendment 4 to R-1 outlines the procedures by which GR-S will be controlled commencing with the third quarter of 1946. The Rubber Division will authorize on Form CPAI-3488 the amounts that may be acquired in each quarter.

These authorizations will permit manufacturers to buy their monthly supplies from the Office of Rubber Reserve of the Reconstruction Finance Corp., and the amounts permitted are based on reports covering past consumption, inventories, and estimated future production.

After August 1, 1946, inventories of GR-S are limited to 30 days or a practical minimum working inventory, whichever is less (Priorities Regulation 32, Table 1).

"Manufacturing facilities capable of producing a million tons of GR-S a year are in existence today," Mr. Sears said. "However it has not been possible to operate all facilities because of insufficient supplies of alcohol. And alcohol production cannot be boosted because grain is needed to feed millions of starving people throughout the world. The plants which utilize petroleum rather than alcohol as a raw material for making butadiene, the principal ingredient of GR-S, are capable of producing only about 600,000 long tons a year," he added.

"The rubber manufacturing industry has been able to convert a substantial amount of the wartime manufacturing facility expansion to the production of peacetime goods so that today the industry is in a position to consume at least 1,100,000 long tons of new rubber per year," Mr. Sears said.

Due to political difficulties in two of the major producing areas of the Far East and because time is required to organize new tapping operations, it has not been possible to acquire sufficient natural rubber to permit the consumption of more than 260,000 long tons in 1946. Therefore in order to support increased production to the greatest extent it has been necessary to make available the greatest amount of GR-S possible.

"Since both natural and synthetic rubber remain in critically short supply, whatever amount is available must be distributed as equitably as possible among rubber manufacturers," Mr. Sears further declared.

The amendment issued July 29 formalizes procedures put into operation during the second quarter, when it became definitely apparent that rubber supplies would fall short of industry's needs.

To conserve the limited supply of thin pale crepe natural rubber, CPA on August 7 revised, by amending Direction 13 to R-1, the list of permitted products in which this material may be consumed.

"The decreasing supply of thin pale crepe natural rubber has made it necessary to limit its use to those products, principally medical, which experience has shown cannot be manufactured from any other type of natural rubber," Mr. Sears explained.

The Office of Rubber Reserve of the Reconstruction Finance Corp. has an inventory of approximately 1,000,000 pounds of first-grade thin pale crepe natural rubber at present. CPA said that because no additional supplies of thin-type crepe, normally imported from the Far East, are expected during the balance of the year, this conservation step is vitally necessary.

Pale crepe rubber is used in producing a variety of hospital and medical items requiring the very best natural rubber. Hereafter, Mr. Sears said, such items as medical stoppers, dental dams, and dental rubber will have to be made of thick pale crepe instead of thin pale crepe. These and other changes are included in the revision.

Then on August 21, Mr. Sears announced that about 30 products, including rubber cement for all purposes, shoe soles and heels, tennis and squash balls, and baseball and golf ball centers, have been added to the list of items which may be made wholly or partly from natural rubber and in some instances Butyl. At the same time, use of rubber latex, now in extremely short supply, was restricted to a stated list of products. The list is composed chiefly of medical goods, but includes food-sealing compounds and some rubber-protected or lined equipment such as that for handling corrosive materials and explosives.

These actions were taken by issuing a revised R-1, which incorporates Appendix I and all recent amendments.

Mr. Sears explained that it is possible to increase the number of products which may be made from natural rubber and increase the percentage used in other articles because of larger supplies from the Far East. He said that the expanded consumption which will result from the revision of R-1 will not decrease quantities available for tires, other transportation products, or stockpiling.

Among the important revisions, Mr. Sears said, is a redefinition of scrap rubber which will prevent reuse of high-quality natural rubber scrap in products not authorized to be produced.

In general, as much as 10% natural rubber will be permitted in shoe soles and heels, although special heels which will not leave marks on floors are permitted from 30 to 50%. Surgical tape and cohesive bandage may contain 50% natural rubber instead of 15%, and conveyer and elevator belting 35 instead of 25%. The amount of natural rubber in flat transmission belting is increased from 0.07-pound to 0.45-pound per 1,200 square inches of ply.

Permissible inventories of natural rubber and rubber latex remain at 60 days; those for all types of synthetic rubbers and reclaimed rubber have been set at 30 days. Previously the maximum inventory for reclaimed rubber was 45 days and for GR-S, 30 days.

The revised order permits resumption of transit shipments in bond of rubber and rubber products through the United States from one foreign nation to another. These were prohibited during the war.

The amount of GR-S which may be used each month by one firm or individual for experimental purposes now will be limited to 250 pounds. Previously there was no limitation.

With the reissuance of the rubber order and Appendix I on August 21 and the reissuance of Appendix II, which covers tire manufacturing, on August 15, all CPA rubber controls and proced-

ures are now described in these two documents.

Producers of GR-I, GR-S, and reclaimed rubber are now eligible for priority assistance to maintain or increase production, CPA announced August 28. The action was taken by adding these three items to Schedule 1 (the critical materials list) of Priorities Regulation 28. Producers of GR-I and GR-S now may obtain CC ratings to purchase production materials, replacement equipment, additional equipment for increased production of petroleum butadiene, and materials needed for maintenance, repair, and operation and for construction. Producers of reclaimed rubber may obtain CC ratings to purchase capital equipment, materials for maintenance, repair and operation, and for construction.

During the last five months, demand has been such that the rubber manufacturing industry has consumed every pound of natural, synthetic, and reclaimed rubber on the market, Mr. Sears said. Because of this demand, facilities producing synthetic and reclaimed rubber must be given assistance in obtaining the materials needed to maintain maximum production.

War Assets Administration, Washington, D. C., last month included among items available for purchase from surplus stocks large quantities of 56- and 36-inch aircraft tires and tubes and 16 "C"-type motorized balloons of two-ply neoprene-coated fabric, without engines.

William Dudde was appointed Deputy Director of Regional Disposals for WAA's Region II, comprising New York, New Jersey, and Fairfield County, Conn. Formerly a tire distributer in New York for such major companies as U.S. Rubber, Firestone, and Kelly-Springfield, Mr. Dudde in 1942 sold his business to retire, but accepted an invitation of the RFC to head its "Idle Tire Program" in the New York area. Subsequently he was asked by the RFC to head its warehousing division, handling the stockpiling of critical materials for the war. With the end of the war, he directed the RFC warehousing of all material for reconversion, leasing, or buying space totaling four million feet closed and five million feet open. Now, after having warehoused all this material, it has become his job to help sell it.

United States Department of Agriculture, Washington, D. C., on July 29 suspended WFO 42a, which controlled the use of fats and oils in the manufacture of protective coatings, floor coverings, and coated fabrics since October 1, 1942.

The Electric Storage Battery Co., manufacturer of Exide batteries, Philadelphia, Pa., has appointed Kenneth W. Green assistant purchasing agent. Mr. Green entered the employ of the company in 1927 and served five years on the sales staff of the Pittsburgh branch of the company before going to Philadelphia. In 1937 he was made manager of railway sales, and early this year the engineering sales division, which he had been supervising during the war, was merged with the railway division, and he was put in charge as the manager.

CALENDAR

Sept. 9-13.	**American Chemical Society. Chicago, Ill.**
Sept. 10-14.	**Chemical Show. Coliseum, Chicago, Ill.**
Sept. 14-17.	**National Association of Waste Material Dealers, Inc. Fall Convention. Palace Hotel, San Francisco, Calif.**
Sept. 20.	**Philadelphia Group. Annual Outing. Oak Terrace Country Club, Ambler, Pa.**
Sept. 21.	**Connecticut Rubber Group. Outing.**
Sept. 26-28.	**High-Polymer Division, A. P.S.—Fiber Society. Symposium on Textiles and Fibers. Charlottesville, Va.**
Oct. 1.	**Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.**
Oct. 4.	**Boston Rubber Group. Copley Plaza Hotel, Boston, Mass.**
Oct. 7-11.	**National Safety Congress and Exposition. Chicago, Ill.**
Oct. 18.	**New York Rubber Group. Hotel McAlpin, New York, N. Y.**
Oct. 18.	**Detroit Rubber & Plastics Group, Inc. Detroit Leland Hotel, Detroit, Mich.**
Nov. 12.	**Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.**
Dec. 2-6.	**American Society of Mechanical Engineers. Annual Meeting. New York, N. Y.**
Dec. 3.	**Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.**
Dec. 13.	**New York Rubber Group. Christmas Party. Hotel McAlpin, N. Y.**
Dec. 15.	**Detroit Rubber & Plastics Group, Inc. Detroit Leland Hotel, Detroit, Mich.**

New Export Rulings

"Current Export Bulletin No. 353," July 25, states that the Office of International Trade has announced that, effective with the third quarter, the quota of new passenger-car, truck, and bus tires for export will be licensed in accordance with the following general policy:

1. Requirements for UNRRA will first be set aside.
2. Twenty per cent. of the balance will be set aside for non-producers who exported less than 1,500 tires a year on an average during the base period 1939, 1940, and 1941, exporters who qualify for Veterans Preference, projects, and contingencies.
3. Sixty-five per cent. will be distributed among traditional tire exporters and producers on the basis of historical participation in exports. The remaining 15% will be reserved for new producers of tires for export and distributed on the basis of their percentage of United States production. New producers are defined for this purpose as those who exported less than 1,500 tires a year on an average during the aforementioned base period.

In the distribution of the quota among all producers and traditional exporters consideration will be given to shipments actually made in the past against export licenses granted such applicants.

Bulletin 356, August 12, explains the British Token Import Plan, under which arrangements have been made with the British Government to import into the United Kingdom token shipments of certain United States branded products whose importation was formerly forbidden as a war measure. Among the commodities subject to the plan are: the following waterproof rubber footwear: men's short boots, cleated, men's stormking, cleated, women's short boots, cleated, women's and misses' short boots, varnished; rubber heels and soles; surgeon's rubber gloves; anti-skid chains; fountain pens and parts; rubber belting other than conveyer belting.

Bulletin No. 358, August 20, states that no export license applications for "Factory Reject" tires will be considered unless the applications state: "These tires are 'Factory Reject' tires and may be readily identified as such by the original factory branding which reads 'Rejects,' 'Rej.' or other identifying mark appearing on the sidewall of each tire."

The bulletin further explains that export license applications for unused military surplus tires will be considered as applications for new passenger-car, truck, and bus tires unless the applications are accompanied by the original invoice or photostatic copy thereof from the WAA or the original producer of these tires, or unless the applications bear this statement: "These tires are unused military surplus tires and may be readily identified as such by the original factory branding which reads 'Military' or 'Mil.' or other identifying mark appearing on the sidewall of each tire."

The Automotive Safety Foundation has moved its headquarters in Washington, D. C., from 321 Tower Bldg. and 726 Jackson Pl., to 700 Hill Bldg., 839 17th St., N. W., Washington, 6.

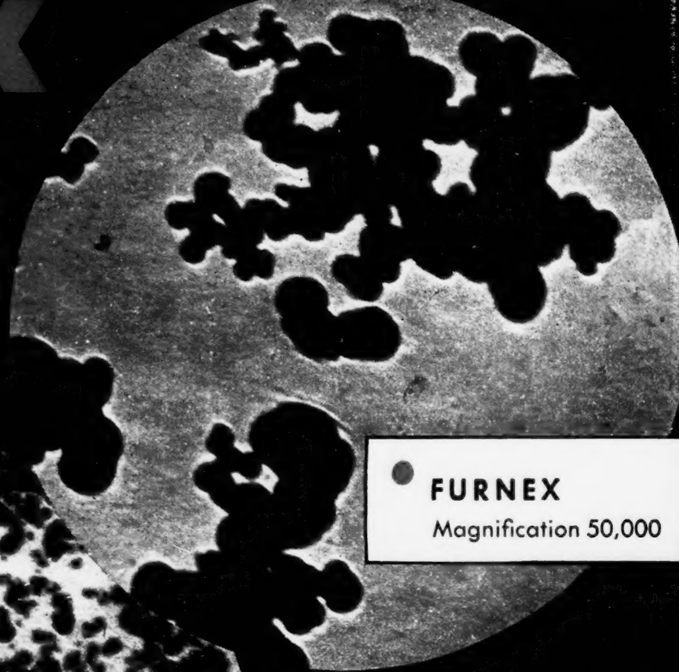
Theodore A. Werkenthin, principal materials engineer, civilian-in-charge of the rubber and plastics section of the Bureau of Ships, Navy Department, Washington, D. C., on August 8 received from Vice Admiral E. L. Cochrane, chief of the Bureau, the Meritorious Civilian Service Award for outstanding service in connection with all research and technological problems on natural and synthetic rubber and plastic elastomers during World War II.

Jefferson Chemical Co., Inc., 30 Rockefeller Plaza, New York 20, N. Y., has made P. M. Dinkins president and a director. Jefferson Chemical was organized in November, 1944, by American Cyanamid Co., and The Texas Co. to produce chemicals from petroleum and petroleum gases. Its first plant, now under construction at Port Neches, Tex., will produce intermediate chemicals used in the synthetic rubber, plastics, textile, and other industries. Mr. Dinkins has been associated with American Cyanamid since 1923. He received his B.S. in chemical engineering from Massachusetts Institute of Technology in 1918.

Photographs developed in the Research Laboratories of Columbian Carbon Co.

FURNEX

The electron microscope reveals a particle three times as large as that of Channel Carbon



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... Softer stocks.

... Higher rebound resilience.

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Revived OPA Grants Many Price Increases

Shoe repair shop maximum prices for rubber heels attached have been increased 5¢ a pair by Amendment 23 to MPR 200—Rubber Heels and Soles in the Shoe Repair Trade—effective July 26, 1946. This amendment permits shops to pass on to consumers a 10.5% increase allowed simultaneously in the ceilings of the same rubber heels at the manufacturing and wholesale levels.

Ceilings for rubber soles sold in the shoe repair trade were also raised 10.5% at manufacturing and wholesale levels. However the ceilings of shoe repair shops for rubber soles remain unchanged, pending completion of studies to determine whether such ceilings need to be raised, and if so by how much.

The above increases have been necessitated by recent higher costs to manufacturers for labor and materials.

Amendment 23, however, does not apply to rubber heels and soles sold in the shoe factory trade. A similar increase was recently allowed on such sales.

The new ceilings of shoe repair shops for men's rubber heels attached to the customer's shoes is now 65¢ a pair for top-grade brown heels; 60¢ for standard brown heels; 55¢ for standard black heels, and 50¢ for competitive black heels. Women's rubber heels have new ceilings ranging from 25¢ a pair for a popular-type top lift to 55¢ a pair for top-grade cuban heels. Boys' whole heels will have new ceilings ranging from 45 to 65¢ a pair. These dollar-and-cent repair shop ceilings are nation-wide.

Maximum prices for red heels and soles at all levels of sale will be the same as the existing ceilings for brown heels and soles. White heels and soles are given the March, 1942, base period differential of the seller above the existing ceilings for brown heels and soles.

As Amendment 23 did not provide physical specifications for the whole brown heel items mentioned therein, Amendment 24 was issued to remedy this omission. Not only is the standardization required in conformity with industry practice, but this standardization is the only practicable method of securing effective price control.

Amendment 1, Order 15, MPR 200, deletes the word, "men's", from paragraphs (a) and (b) and adds a women's heel to the table in the latter paragraph.

Retail ceilings for waterproof rubber footwear have been increased 10% on the average, under Amendment 8 to RMPR 229—Retail and Wholesale Prices for Rubber Footwear—also effective July 26. This action will enable retail sellers to pass on recent increases in wholesalers' and manufacturers' ceilings for this footwear. Studies by OPA disclosed that retailers could not absorb those increases. While the retail increases will average approximately 10%, they will range both below and above that amount, depending on the class of seller and the particular footwear being sold.

But canvas and casual rubber footwear maximum prices are not changed, OPA pointed out.

Simultaneously with Amendment 8, retail ceiling for waterproof rubber footwear were placed on a formula basis, to simplify pricing of new lines by retail stores. Previously there were dollar-and-cent ceilings for standard items and formula ceilings for specialty items. The substantial increase in the number of specialty items now being produced makes it desirable to have only one retail pricing method for all waterproof rubber footwear, OPA explained.

Retailers will determine their ceilings by merely dividing their net purchase prices by .66 in the case of mail-order house sales and by .62 for all other retail sales. This method allows the customary margin of 38% on all retail sales except those by mail-order houses, which are allowed the usual 34% margin.

Amendment 2 to Order 5, MPR 132, covers maximum prices for the neoprene dipped footwear item bearing the brand name, "Shower Toes," and made by Kelly Rubber Co., Massillon, O.

Four additional items of rubber footwear declared surplus by the government and now being sold in civilian channels were given maximum prices by Second RO 91 under Supplementary Order 94—Special Maximum Prices for Sales or Surplus Rubber Footwear—effective August 13. The new prices are for sales by the government and by wholesalers. Retail prices are governed by Revised Supplementary Order 122, which provides methods for resellers of surplus commodities to use in figuring their ceiling prices.

The above items and their ceilings follow:

Item	Sales by the Government to Jobbers	Sales by the Government to Retailers	Sales by Wholesalers
Men's stormking boots	$3.20	$3.65	$4.70
Men's 12-inch lace pacs	2.40	2.75	3.55
Women's low slide rubber gaiter	1.20	1.35	1.75
Women's over-the-shoe boots	1.35	1.55	2.00

Continuing its policy of consolidating under one regulation all government surplus property sold by resellers, OPA on August 8 announced that four more products had been placed in this category and resellers' percentage markups established for them, effective August 13. The items were transferred from other regulations for purpose of simplification. Included is rubber and canvas footwear with a percentage markup at retail of 62. (Amendment 1 to Revised Supplementary Order 122—Resales of Certain Commodities Sold by Government Agencies.)

These markups reflect recognized trade practices. New sellers will take the markups provided by this action. Established sellers, already handling these items, will take the markups already being employed by them.

The agency pointed out that the markups found under this order (Revised Supplementary Order 122) are spelled out specifically for purposes of clarity. Under the regulations from which these items were transferred markups were arrived at by computations sometimes found confusing by resellers.

The wholesale markups for rubber and canvas footwear are covered under other regulations, it was explained.

Tire Orders Affected

Ceiling prices for all sellers of black and white sidewall passenger-car tires have been established at 12.5% above ceilings for all-black sidewall tires, according to Amendment 12 to RMPR 143—Wholesale Prices for New Rubber Tires and Tubes—and Amendment 8 to RMPR 528—Tires and Tubes, Recapping and Repairing, and Certain Repair Materials—both effective August 21. Examples of the new retail ceilings for the black and white tires are $17.65 for the 6.00x16-4-ply, and $21.45 for the 6.50x16-4-ply, two of the popular-size sellers.

Production of black and white sidewall passenger-car tires was prohibited during the war, OPA said. With the increase in the supply of rubber, however, limited production is now under way.

The new ceilings were set according to data available to OPA, which indicate that prices generally in effect in the industry for black and white sidewall passenger-car tires in 1941 were approximately 12.5% above those for the black sidewall passenger tires, the agency said.

Retail ceilings on passenger-car, motorcycle, truck and bus and industrial tires have been increased approximately 2½% to meet the requirement of the new price control act that distributers be allowed their percentage mark-up of March 31, 1946. (Amendment 13 to RMPR 143; and Amendment 9 to RMPR 528—both effective August 23, 1946.)

The increase is allowed both on sales by retail dealers and on all sales at retail by wholesale distributors. The new retail ceiling for the popular-size 6.00-16 four-ply passenger-car tire, which represents 70% of all passenger-car tires sold, will be $16.10, compared with $15.70 previously.

On all sales of passenger-car and motorcycle tires to resellers by wholesale distributers, an increase of approximately 1.2% is allowed. No increase is provided in existing ceilings for sales of truck and bus and industrial tires to resellers by wholesale distributers, as prevailing methods of determining ceilings for these sales already yield the required March 31, 1946, margins, OPA said.

No retail or wholesale price ceiling increases are provided on farm tractor, farm implement, airplane or bicycle tires, as no increase has occurred in manufacturers' ceilings for such tires since March 31, 1946.

OPA pointed out that on June 18, 1946, manufacturers' ceilings were raised on passenger-car, motorcycle, truck and bus and industrial tires. The increases were keyed to a rise of 50¢ in the popular-size 6.00-16 four-ply passenger-car tire. At that time retail ceilings for passenger-car and motorcycle tires were given the same dollar-and-cent increases as manufacturers' ceilings. Retail ceilings were not advanced at that time on truck and bus and industrial tires, as generally sales were being made of these tires at discounts off the existing ceilings, and retailers could, if desired, go up to their established ceiling levels.

Order 38, RMPR 143, sets the maximum retail prices for 72 new sizes of industrial wheel retreads, vulcanized on customer's wheel, manufactured by The Goodyear Tire & Rubber Co.

To facilitate pricing by the tire and tube repair material industry during the transition period, the establishing of manufacturers' maximum prices for new items has been simplified, by Amendment 5 to RMPR 131—Camelback and Tire and Tube -Repair Materials—also effective July 26. The change permits the setting of ceilings on new items in line with the ceilings for the same or similar items sold by another manufacturer. The former requirement of detailed cost figure is abolished.

In making applications for ceilings on new items, manufacturers now will mere-

ly give a description of the new item, proposed price, and the same or similar item providing the basis for the in-line pricing.

At the same time provision is made for individual relief where manufacturers are suffering financial hardship under their existing ceilings. Applications for this relief may be made when financial hardship is impeding or threatening to impede production.

Order 34, RMPR 131, authorizes prices for the introductory-size So-Lo rubber repair kit containing a ½-ounce tube of cement and a can of plastic rubber, manufactured by So-Lo Works, Inc., Loveland, O.

Without changing the general level of prices, OPA by Amendment No. 13 to MPR 435—New Bicycle Tires and Tubes —effective August 28, 1946, announced the substitution of dollar-and-cent maximum prices for replacement bicycle tires and tubes according to size and type. Thees prices replace existing ceilings based on various brand names. The new pricing method relieves OPA of the necessity of amending its regulations for each change or creation of a new brand name. The former method resulted in some delays for sellers, OPA explained.

Ceilings for tires are set according to whether the tire is clasisfied as Standard Lightweight, DeLuxe, Premium, Special Purpose, or Single Tube. Tube ceilings are listed for Standard, Thorn and Puncture Resistant, and Premium.

Brand owners are required to submit a list of their brand-name tires to OPA, showing what type-tire or tube each represents. Tires and tubes not included in the dollar-and-cent ceilings set up by this action may be priced by authorization upon application to OPA, the agency said. Such application must set forth sufficient information from which an in-line price may be obtained.

All existing OPA provisions concerning ceiling prices for sales to brand owners and for sales to original equipment buyers remain unchanged. No change is made, either, in cash and volume discount provisions in effect for sales to jobbers, or in the pricing of factory-second bicycle tires and tubes.

The following orders were recently added to RMPR 528—Nos. 126 and 127 indicate the maximum retail price for the services of recapping certain tires with Rock Service type of tread. No. 128 authorizes retail ceilings for six new sizes of semi-solid (hollow center) ribbed cushion industrial tires made by The Goodyear Tire & Rubber Co., Akron; No. 129, ceiling for a Goodyear farm tractor type of inner tube; 130, for four sizes of new tractor tires of Firestone Tire & Rubber Co., Akron; 131, for 16 sizes of new synthetic rubber stop-start Silvertown truck tires of The B. F. Goodrich Co., Akron; 132, for a puncture-sealing aircraft type of inner tube; No. 133, for a synthetic rubber industrial semi-solid cushion tire, fabric base, Firestone; No. 134, six sizes of rayon all-traction logger tires, Firestone; No. 135, Ground Grip Road Builder tire, Firestone; 136, eight sizes of Ward's Riverside Super Service stop-start rayon truck and bus tires, Montgomery Ward, Chicago, Ill. Order 137 gives the maximum retail prices for the service of recapping with any one of the three grades of camelback two tires, sizes 5.50-15 and 6.00-15, and also gives the retail ceilings for sales of basic tire carcasses in those two sizes. Amendment 1, Order 75, "Oil Pruf" industrial solid pressed-on and Vulc-on tires and replacement retreads of neoprene or "Novite" compound, Goodrich; Amendment 1, Order 106, 14 new stop-start special service truck tires, Dayton Rubber Mfg. Co., Dayton, O.

Amendment 1 to Supp. Service Reg. 66, RMPR 165, modifies the maximum price for the services of splitting whole and beadless tires into their component parts.

Amendment 104, section 1418.151, RMPR 373, revises the lists of prices for synthetic rubber tires and tubes sold in Hawaii.

Other Regulations Changed

Manufacturers' ceilings for rubberized protective clothing have been increased 8.6% by Amendment 28 to MPR 220—Certain Rubber Commodities — effective August 19. The increase can be passed on by distributers of this clothing, which represents specialized apparel, such as rubberized coats and aprons, for industrial workers.

Wholesalers' ceilings are being adjusted in a separate OPA action. Retailers can add to their new cost of acquisition the percentage margin they had on March 31, 1946.

Amendment 28 was adopted because the old ceilings were causing financial hardship to the industry, and any cessation in production would result in a serious shortage in this necessary clothing.

The increase is based on data covering only the month of March, 1946, because it was the latest available accounting period which accurately reflected the normal production experiences and requirements expected during the ensuing 12 months. The industry experience during 1945 and during the first two months of 1946 did not reflect normal conditions. In 1945 the industry was making the necessary adjustments from war to peacetime production; and in the first two months of 1946 the changeover was retarded by an unsettled labor market and a serious shortage of material supplies.

The results of this action will be reviewed in the light of further data to be obtained from operating experiences for the second quarter of 1946, OPA said.

Amendment 29 to MPR 220, effective August 27, provides a mechanism whereby manufacturers of brassieres, corsets, girdles, and elastic girdle blanks may adjust the maximum prices determined under the first and second pricing methods of this regulation for these commodities by adding the difference in direct labor cost between March, 1942, and June 30, 1946. The basic purposes of this order are (1) to furnish relief to manufacturers of these base-period staple garments, and (2) to facilitate the continuation and the resumption of production of these comparatively higher quality base-period garments.

Manufacturers' and distributers' ceilings for rubber druggists' sundries have been increased approximately 10%, and at the same time OPA gave a 10% increase in wholesalers' and retailers' maximum prices for these products, which include hot water bottles, fountain syringes, ice caps, and rubber bulb goods such as atomizers. These increases at the various levels of distribution became effective August 14. (Amendment 4 to RMPR 300 —Rubber Drug Sundries—Amendment 3 to RMPR 301—Retail and Wholesale Prices for Rubber Drug Sundries.)

The increase for manufacturers and distributers, who sell under their own brand names, is required to take care of higher cost of labor and materials at the manufacturing level. In addition, distributers selling under their own brand names who buy directly from original manufacturers customarily sell to wholesalers or retailers at the same prices as manufacturers. Consequently to preserve this industry price pattern, brand-name distributers are given the same increase as manufacturers.

The increases are based on data supplied by companies making 75% of the industry's total production in the last quarter of 1945 and the base period, 1936-1939, and are designed to enable it to earn its base period return on net worth.

The 10% increase granted resellers of these products is necessary to keep their margins at March 31, 1946, levels, as required by the new price control act, OPA said.

Amendment 13 to MPR 82, among other changes, permits manufacturers of wire and cable, except armored cable, to revise price lists to include increases granted June 3 and 4.

Amendment 14, MPR 82—Wire and Cable—adds a section dealing with maximum prices of aluminum steel-reinforced transmission line cable, weatherproof aluminum wire, and insulated aluminum wire and cable.

MPR 406—Synthetic Resins and Plastic Materials and Substitute Rubber—has been revised to permit higher prices. As a result of increased costs the ceilings of some manufacturers are not sufficient to cover their costs, and it is felt that these manufacturers may have to discontinue production unless some relief is granted them. The price increases that may be granted under the adjustment provision of Amendment 11, effective July 26, are based on the ground of maintaining supply of these essential materials. The amendment provides a device by which such policy may be effectuated. No adjustment will be allowed under the amendment unless OPA finds that supply cannot be maintained without a price increase.

Amendment 12 provides for increases of 12 and 8%, respectively, in the maximum prices for sales by manufacturers of plastic thermosetting laminates and vulcanized fiber in the form of sheets, rods, tubes, and preforms, also to compensate for higher production costs.

Manufacturers of one minor segment of synthetic resins, those containing butyl alcohol, may increase their ceiling prices when their delivered average cost of butyl alcohol is above 17¢ a pound, according to Amendment 13 to MPR 406, effective August 27, which was adopted because existing ceilings did not cover total production costs when the cost of butyl alcohol, an important ingredient exceeded 17¢ a pound.

RMPR 165, Amendment 8 to Rev. Supp. Service Reg. 50, provides that the Regional Administrator for Region V may issue area orders establishing ceilings for automobile washing, greasing, polishing, tire changing, and battery services, in Region V.

Increases in manufacturers' ceiling prices for all automotive parts over their base date freeze prices were announced August 19 by the OPA. Included in these increases are fan belts, 17.3%, radiator hose, 26.8%.

Besides OPA removed catalog houses and trade name resellers who sell only standard parts which they buy from pro-

ducers from coverage by the manufacturers' price schedule (MPR 452) and placed them under the regulation covering distributers (MPR 453.) This change will enable these resellers to raise their maximum prices like other distributers sufficiently to cover acquisition costs and the discount or mark-up in effect March 31, 1946, for the distributive level in which they operate.

The increases are being granted on an industry-wide basis instead of through individual adjustments to speed production of replacement automotive parts. OPA pointed out that production of new passenger and commercial cars has fallen far short of expectations with the result that used vehicles must be repaired more frequently and the demand for repair parts is great. The industry doubled its 1941 dollar sales volume last year, but an acute shortage remains in many lines of replacement parts, OPA said.

The increases for radiator hose and fan belts affect only a few firms who perform part of the manufacturing operations of these products and who previously were required to absorb the 26.8% and the 17.3% increases in their supliers' prices. The new change permits these sellers to pass on the increases by raising their ceiling prices for these products the same percentage amounts as they pay their suppliers.

(Amendment No. 15 to MPR 452—Manufacturers' Maximum Prices for Automotive Parts; and Amendment 9 to MPR 453 — Wholesalers and Retailers Maximum Prices for Automotive Parts—both effective August 24, 1946.)

The following orders have been issued for MPR 478, authorizing maximum prices for pyroxylin or vinylite coated fabrics for sale by the converters or wholesalers indicated: No. 181, Clifton Mfg. Co., Clifton, S. C.; 182, Walton Cotton Mill Co., Monroe, Ga.; 183, Inman Mills, Inman, S. C.; 184, D. E. Converse Co., Glendale, S. C.; 185, Clifton; 186, Inman; 187, R. S. Dickson Co., Rockingham, N. C.; 189, Fostex, Inc., Spartanburg, S. C.; 190, Dickson; 191, Converse; 192, Hood Rubber Co., Watertown, Mass.; 193, Weymouth Art Leather Co., Inc., South Braintree, Mass.; 194, Fostex; 195, 196, 198, 199, Weymouth Art; 197, Fostex; 200, Walton; 201, Clifton. Order 188 sets ceilings for neoprene coated fabrics made by Hood.

Amendment 1 to R0 21, RMPR 86, approves ceilings for washing machines equipped with certain-type motors, of the Firestone Tire & Rubber Co.

Order 798, MPR 591, authorizes maximum delivered prices for sales by Firestone and resellers purchasing therefrom of the REF 106 Eskimo freezer.

Price Controls Lifted

Suspension from price control of obsolete gaskets, packings, and oil seals containing rubber and many other items made of rubber was also announced July 26 by OPA. These products do not in general enter substantially into either the cost of living or business costs. Moreover price increases likely to follow the suspension action are not expected to exceed in any case the increases that the agency would be required to grant in conformity with its pricing standards, OPA said.

The gaskets, packings, and oil seals containing rubber or synthetic rubber, also covered by the suspension action, include mechanical packings, packing in sheets, slabs, and strips, gaskets, and other packing products. OPA explained that about 95% of these products are sold to industrial consumers. However the average industrial consumer buys only about $200 worth annually; so their cost makes up only a small part of their business costs. Furthermore the few sold for household consumer use where they are required for repairs, could have little effect on the cost of living. Finally, the administrative burden of continued control would more than offset all possible benefits of continued control of these products, the agency said.

In addition more than two-score druggists' sundries made wholly or partly of rubber, most, but not all of which are sold to doctors, hospitals, and clinics rather than individual consumers, have been suspended from price control. Most of these products are hand made, and their manufacturing costs have increased substantially owing to high material casts and labor rates. As a result, manufacturers would be entitled to high ceiling prices for these products if they remained under control, which would add greatly to the heavy administrative burden of control in this field. Finally since the items do not substantially affect living or business costs, and production capacity and supplies are ample to meet demand so that no threat of diversion from more essential production exists, price control over them is being suspended.

These commodities include acid bottles; air mattresses and pillows; bands and cushions for artificial limbs; portable bath tubs; blood pressure bags, bulbs, and tubing; food transfusion connecters; brain surgery caps; cable wrapping tape, caps, and closures; colonic bags; colostomy outfits; crutch parts; cushions; dilators; evacuators; corrective foot appliances and parts; funnels; glass molded neoprene surgical tubing; hanger bags; inhalation bags and face pieces (medical, surgical, dental, veterinary, and laboratory); insufflators; intravenous connectors; medicine droppers and bulbs; microscope covers; Orsat bags; orthopedic pads and parts; parts for medical, surgical, veterinary and mortuary instruments; parts for acoustic aids; prophylactics; prostatic bags; prosthetic devices and parts; sinus pads and bags; spatulas; splint cushions; suppositories; thermapeutic applicators; thermometer cases; tourniquets; truss parts; umbilical belts; urinals; veterinary sleeves; and X-ray sheets, gloves, aprons, and cooling hose.

Among other minor items also suspended from price control by this action are fruit jar rings, horse and mule shoes, horseshoe pads, calks and other horseshoe accessories and specialty paint-masking products.

The price agency said that a close check of the prices of the products from which controls are being lifted would be maintained and that if any of them rise unduly, control will be restored promptly.

(Amendment 35 to Supplementary Order 129—Exemption and Suspension from Price Control of Machines, Parts, Industrial Materials, and Services—effective July 26.

Amendment 40 to S0 129 added to the list of products from which price controls are lifted the following: ordinary channel (or carbon) black (used in the production or rubber, color, or ink), and premium channel blacks selling for 6¢ or less at the manufacturing level; resins in the form of monomers, polymers, copolymers of vinyl chloride, vinyl acetate, vinyl butyral, vinylidene chloride, and styrene, as well as plastic materials containing at least 50% of the foregoing resins in the form of sheets (including continuous sheeting), rods, tubes, and compounds for molding and extrusion before fabrication; and certain types of special-purpose bicycle tires including sulky, racer, and special thorn resisting tires, and tires for a two-wheel vehicle used to transport portable saws, such as timber saws.

Among products exempted from price control by Amendment 45 to SO 126—Exemption and Suspension of Certain Articles of Consumer Goods from Price Control—effective July 26, are rubber floor mats and runners.

Another group of products exempted from price control is covered in Rev. SO 127, Amendment 3—Exemption and Suspension of Certain Commodities and Services from Price Control in the Territories and Possessions of the United States. Included are: rubber floor mats and runners; rubber, composition, and fabric stair treads; rubber and synthetic articles as follows: bug dusters, bulb sprayers, drainboard, tub, kitchen, refuse can and shower mats, kneeling pads, plate scrapers, sink stoppers, soap trays; garden hose fittings; nozzles, sprayers, sprinklers, clamps, couplings; window and floor squeegees; certain toys and games and parts thereof; surgical abdominal, ankle and arch supporters, elastic hosiery, trusses; moistener for sealing envelopes, etc.; protective face shields, tire pumps; rubber stamps; clothback pressure-sensitive industrial tape; friction tape and splicing compound; truck tire flaps sold for replacement purposes; barite; bentonite; kaolin; kieselguhr; mineral fillers; whiting; air mattresses and pillows; portable bath tubs; blood pressure bags, bulbs and tubing; cable wrapping tape; colonic bags; fruit jar rings; certain gaskets, packing and oil seals; glass molded neoprene surgical tubing; certain inhalation bags and face pieces; prophylactics; X-ray sheets, gloves, aprons, and cooling hose; repair of truck tires above the 16:00 size.

Then late in the month (August 30) OPA reported that all sales of rubber footwear by manufacturers, wholesalers, and retailers had been suspended from price control. This action (Amendment 46 to SO 129) is in compliance with a provision of the Price Control Extension Act of 1946 providing for removal of controls when the supply of any non-agricultural commodity exceeds or is in balance with demand.

At the same time OPA announced suspension from price control of manufacturers' sales of specified obsolete automotive replacement parts usable exclusively in 1938 or earlier model year automobiles.

The Okonite Co., manufacturer of insulated wires and cables, Passaic, N. J., has named R. S. Keefer sales manager to succeed Edward J. Garrigan, vice president in charge of sales, who died in July. Mr. Keefer, formerly assistant sales manager of the company's Hazard Insulated Wire Works Division, started his career in the Hazard insulating mill at Wilkes-Barre, Pa., in 1922, later entering the sales department, in which he has been active for the past 20 years.

EASTERN AND SOUTHERN

Calco Appointments

Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J., has made the following organizational changes in its control and development department: W. A. Raimond and T. H. Thelin have been appointed chief chemists of the vat dyes and intermediates divisions, respectively. G. S. Herrick, C. E. Lewis, and R. H. Ebel have been named assistant chief chemists of the basic dyes, organic pigments, and rubber chemicals divisions, respectively.

Calco also made W. M. Boyce a southern representative calling on the paper and gasoline refining industries for the Heller & Merz department. Mr. Boyce, recently released from the U. S. Army, previously had been with Ohio Boxboard Co. as a chemist's assistant and later as mill inspector and color inspector in 1940.

The mounting activity in the textile paper, and leather industries has compelled Calco to reorganize its dye application laboratories into three main division: Textile; leather, paper, and plastic; and evaluation and testing.

A. L. Peiker has been appointed associate manager and administrative assistant to W. H. Watkins, manager of the dye application laboratories.

O. W. Clark has been made assistant manager in charge of the cotton, viscose rayon, and resin bonded pigments section of the textile division; while H. E. Millson becomes assistant manager to direct the wool, nylon, acetate, and specialties section of the division.

F. O. Sundstrom has been named assistant manager of the leather and paper section, and W. H. Peacock assistant manager of the plastics and specialties section of the leather, paper, and plastic division.

In the evaluating and testing division R. R. Sleeper will be in charge of new product evaluation, and F. C. Dexter in charge of pigment testing and identification.

Calco also reported that the new office of the Chicago branch of its pigment department is now located at 228 N. La-Salle St., Chicago 1, Ill. Gerald J. Boyer, Kenneth A. Coate and Paul J. Cuenot will make their offices at this address.

Raymond Bill, chairman of the board of Bill Brothers Publishing Corp., publisher of INDIA RUBBER WORLD, 386 Fourth Ave., New York 16, N. Y., has been made chairman of the National Distribution Council, an unpaid advisory body formed last month by Secretary of Commerce Henry A. Wallace to have as its main object helping American industry better its distribution capacity and efficiency. Mr. Wallace explained that this voluntary group's function would be to stimulate American business to utilize every practical means "whereby America's ability to distribute and consume the product of its farms, waters, mines, and factories can keep abreast of America's enormously increased capacity to produce." The activities of the 29-member council will be coordinated with those of the government by Under-Secretary Alfred A. Schindler.

Melburne Studios

Arthur Nolan

Form New Latex Concern

Moving to meet the requirements of a vastly expanded market for natural rubber latex, M. Rothschild & Co., Inc., and Arthur Nolan announced August 26 their organization of a new company to handle the distribution of this raw material in the United States. Incorporated under the name, Latex Distributors, Inc., the new company will have offices at 80 Broad St., New York 4, N. Y. Both incorporating parties have had extensive experience in the latex field.

M. Rothschild & Co. actively engaged in import-export for 30 years, is a large shippers' agent, representing numerous Far Eastern rubber shippers. Since 1932 the company has been an importer of large quantities of liquid latex.

Arthur Nolan, vice president and general manager of the new organization, has been actively and exclusively engaged in the liquid latex field for more than 11 years. He was with the United States Rubber Co. for ten years, spending the last three as manager of the company's latex and dispersions sales. He served as principal latex specialist with the War Production Board for one year and has been latex consultant to United States Government agencies for the past four years.

Mr. Nolan has just left for England, France, and Holland to consult with European managers of Far Eastern plantations on United States latex requirements. From London he will proceed to Calcutta, Singapore, and the Dutch East Indies to school production plants in preparing high-quality latex suitable for use by United States manufacturers.

Mr. Nolan, who expects to be abroad about four months, pointed out that American manufacturers are in immediate need of large quantities of natural rubber latex to meet their immediate requirements for production of automotive, medical, and surgical rubber products, tires, adhesives, shoe products, and dipped goods.

Put to general, commercial use hardly more than 15 years ago latex enjoyed a rapidly expanding market up to 1941 when the sweep of the Japanese army into rubber producing areas cut off the bulk of natural latex supplies. As large as prewar consumption had become, however, Mr. Nolan said that current demand would run postwar consumption up to at least five times beyond the 1939-1940 level as soon as natural latex becomes available in sufficient supply. One of the largest increases in consumption will be in the latex foam cushioning field, where adaptations have been made in automobiles, trains, and aircraft as well as in public and household upholstering and bedding.

Tribute to Rubber Industry

The rubber sundries and coated goods industry and the synthetic rubber industry were recently saluted by the Valley Forge Caravan, a radio program, sponsored by the Adam Scheidt Brewing Co., that delivers a salute each night to one of America's industries over Station KYW, Philadelphia, Pa. The show paid tribute to the rubber sundries and coated goods industry on June 24, and hosts for this performance were F. K. Brasted, secretary of the public relations committee of The Rubber Manufacturers Association, Inc.; James Sweatt, manager of the Oak Division, B. F. Goodrich Co.; H. D. Glass, vice president and sales manager of Seiberling Latex Products Co.; and Edwin P. Dawson, advertising manager of Seamless Rubber Co. The program applauded the ingenuity of the industry in converting from civilian, peacetime products to wartime production of many and varied products, including blood plasma tubing, oxygen and gas masks, surgical gloves, instrument bags, and others.

R. E. Powers, Goodrich public relations department, and the public relations committee of the RMA were hosts at the July 26 performance saluting the synthetic rubber industry. The program reviewed the growth of the industry, its wartime performance, and the important role of synthetic rubber in postwar plans.

Hewitt Rubber, Buffalo, N. Y., division of Hewitt-Robins, Inc., has moved its Philadelphia, Pa., district office and warehouse from 20 S. 15th St. to 401 N. Broad St. The moving, the company explained, is part of an overall expansion program to offer greater service assistance and improve deliveries of "Job-Engineered" hose, belting, and other industrial rubber products. The new location is under the supervision of C. F. Holden and Jack T. Sheldon, both of whom are factory trained and have a wide background in the industrial rubber products sales and service field.

Hewitt has appointed Monarch Rubber & Supply, Inc., as a new distributer of its "Job-Engineered" industrial products. Offices and warehouse of the new concern serving the San Francisco-Oakland, Calif., areas are at 546 Howard St., where the company maintains a complete factory stock of industrial hose, belting, and packing. At the head of the new company are Larry J. Burmester and J. J. Foutz, Both are factory trained and have served more than 10 years in the industrial rubber product sales and service field. Mr. Burmester is also a former Hewitt branch manager.

Buys Indiana Plant to Make Automotive Rubber Parts

United States Rubber Co., Rockefeller Center, New York 20, N. Y., on August 1 announced purchase of a government-built plant in Fort Wayne, Ind., for the production of industrial rubber products. The purchase price was $2,100,000. The plant, built in 1941 by the Reconstruction Finance Corp. for the Studebaker Aviation Corp., was used during the war for the manufacture of aircraft engine gears.

The buildings are ultra-modern in design, one-story, air-conditioned, windowless, and equipped throughout with fluorescent lighting. The floor space including both manufacturing and admintrative departments, totals more than 400,000 feet.

Herbert E. Smith, president of the rubber company, announced that equipment will be moved to the site as soon as possible to meet the need of increased production of rubber products required by industry.

It is expected that the plant will employ about 800 people at first, increasing to 1,200 in six months. Further increases are expected when full production is attained.

Fort Wayne will specialize in the manufacture of automobile rubber parts other than tires and tubes, Mr. Smith said. The company makes some 200 auto and truck products, including engine mountings for reducing vibration, steering wheels, rubber window stripping, gaskets, grommets, and seals. The fabrication of these articles will be transferred to Fort Wayne from the company's Detroit plant. The bulk of facilities in the motor capital will be devoted to tires.

Other products to be made in Fort Wayne include rubber bonded grinding wheels, industrial adhesives, rubber covered rolls, and rubber-lined tanks and pipes. These articles are currently made in Passaic, N. J., Providence, R. I. and Detroit. Another important product will be vibration absorption mountings for radios, railroad cars, street cars, aircraft, farm implements, household appliances, industrial machinery, elevators, and air conditioning equipment.

U. S. Rubber will erect a modern $1,500,000 mill room building to service its Naugatuck, Conn., footwear plant. Construction of the three-story steel and brick structure will start as soon as preliminary engineering work is completed. It will measure 100x150 feet and will contain 15,000 square feet on each of its three floors. Work is expected to take from 12 to 18 months, depending on the delivery and availability of critical building materials.

Personnel Activities

Leonard C. Borrell has been named special representative in Venezuela for United States Rubber Export Co., Ltd. He will make his headquarters in Caracas and will be in charge of oil field service throughout Venezuela and refinery service on the islands of Curacao and Aruba. Among the products which Mr. Borrell will handle are rotary, suction, and discharge hose, transmission belting, packings, boots, wire, and cable. Mr. Borrell was scheduled to arrive in Venezuela last month, accompanied on his first field trip by J. K. Irvin, assistant manager of mechanical goods sales.

M. A. Kirkland formerly production manager of the company's textile plant at Winnsboro, S. C., has been appointed manager there in full charge of operations, according to H. Gordon Smith, vice president and general manager of the textile division.

A. E. Jury, whom Mr. Kirkland succeeds, will manage the new products department of the textile division with headquarters in New York and Winnsboro.

Other personnel changes at Winnsboro mills follow: W. C. Hayes, formerly assistant superintendent at Winnsboro, is now production superintendent; R. H. MacDonald, formerly office manager, now assistant to the manager; W. A. Singleterry, formerly office manager at the firm's Shelbyville, Tenn., mill, was named officer manager. In addition A. H. Jackson has been transferred from the company's Stark Mills, Hogansville, Ga., to succeed Mr. Singleterry at Shelbyville.

Mr. Kirkland came to U. S. Rubber in 1920 starting as assistant overseer in the Winnsboro Mills. He became successively overseer of the carding department (1923), night superintendent (1927), technical superintendent (1927), superintendent of Star Mills (1933), superintendent at Winnsboro (1940), and production manager (1942).

In retiring from active management of the Winnsboro Mills, Mr. Jury will be able to devote his full time to development, manufacture, and sale of new products for the textile division, according to the company announcement. Mr. Jury has been in charge of operations at Winnsboro since 1928 with one interruption during the war when he served as factory manager of the company's synthetic rubber plant in Los Angeles, Calif. He has been with the rubber company since 1915 and was formerly in charge of its general laboratories at New York. Mr. Hayes joined the company in 1925 as technician in the laboratory at Stark Mills, was named overseer of twisting there in 1934, was transferred to Winnsboro in 1940 in the same capacity, and was made assistant superintendent there in 1942.

W. B. Anderson has been appointed district manager of U.S. Tires' Seattle district. Mr. Anderson, who was born in Minneapolis, is a graduate of Union College, Class of 1920. He joined the rubber company in 1940 as a Royal Master salesman in Chicago. After various other sales responsibilities, he served as assistant district manager of the Chicago district since 1944.

Ernst Eger, Los Angeles inventor of 65 basic tire and rubber processes and devices, was presented with a Navy citation for his work in developing the self-sealing fuel cell. Rear Adm. E. M. Pace, Jr., presented the inventor with the citation from Rear Adm. H. B. Sallada, Chief of the Bureau of Aeronautics, in a ceremony at Navy headquarters in Los Angeles. Mr. Eger was the first development engineer to whom the Navy looked when the urgent need for protection of gasoline tanks was recognized in 1940. The inventor, whose laboratories are located in U. S. Rubber's Los Angeles plant, was eminently suited for this task as his first bullet-sealing fuel cell had been developed in 1938. In the early stages of the war, both the Army and Navy turned to Mr. Eger for advice on the fuel cell, and he recently was granted basic patents on the device. In the field of tire engineering, Mr. Eger has played a major role in increasing tire mileage performance to its present standards. The Eger invented tube and valve are patented devices used by all tire manufacturers.

Tire merchandising and advertising plans for the fall months, as presented by officials of U.S. Tires division, were discussed by members of the U. S. Distributor Advisory Council at their summer meeting in New York. The three-day session, held at the Waldorf-Astoria Hotel, was presided over by W. D. Baldwin, sales manager of the division, who outlined future sales plans. Recent improvements in synthetic rubber and new tire developments were reviewed by A. W. Bull, director of tire development for U. S. Rubber. Representatives of the U.S. Tires division who addressed the group included J. G. Schaefer, advertising manager; R. A. Denby, manager, distribution planning department; A. G. Westlund, manager, business development department; and Curt Muser, retail merchandising manager.

Arthur Surkamp, treasurer of U.S. Rubber, has been appointed to the executive committee of the forthcoming fifteenth annual meeting of the Controllers Institute of America, to be held in the Hotel Commodore, New York, September 15 to 18.

A new series of television programs entitled, "Serving through Science," sponsored by U. S. Rubber in cooperation with "Encyclopaedia Britannica," began August 27, according to C. J. Durban, assistant advertising director for U. S. Rubber. The programs will be televised each Tuesday night at 9:00 p.m., EDT, for the next six weeks over Dumont's Station WABD and will feature Dr. Miller McClintock, research consultant to "Encyclopaedia Britannica," as commentator. The programs will also be telecast in Philadelphia over Station WPTZ and in Washington, D. C., over Station W3XWT. The telecasts will follow the general pattern set by the company's series of scientific talks in the intermission period of the New York Philharmonic Symphony radio programs, plus the added advantages of films and other visual equipment to add to the general interest and clarity of the programs. The first of the programs, on August 27, "Consumption and Production of Foods," dealt with food and diet conditions in all parts of the world and their resultant effects on the lives and activities of peoples and nations.

Rubber sink stoppers, an item which almost vanished from the market during the war, are now pouring out of U. S. Rubber plants at the rate of five million a year, five times faster than the prewar rate. Despite this record production, there will not be enough stoppers for all the bathtubs and sinks in the country until the middle of 1947 or later, the company reported.

Faucet washers, suction cups, and other plumbing supplies are also coming off production lines in record quantities, but supply is not expected to catch up with demand for many months, it was said.

The Baker Castor Oil Co. has moved its technical division, comprising engineering-research and technical service departments, to 40 Ave. A, Bayonne, N. J.

New York Belting & Packing Co., Passaic, N. J., has appointed George G. Deverall sales representative in New England, New York, New Jersey, and eastern Pennsylvania, according to B. F. Ruether, vice president of the company. Mr. Deverall enlisted in the Army in 1940 and recently went on inactive status with the rank of colonel after a tour of duty in Australia, West Indies, Okinawa, Japan, and other Pacific bases. Since December, 1943, he had been a member of General MacArthur's headquarters staff. Mr. Deverall will make his sales headquarters at the company's plant in Passaic, where he had been employed for 15 years previous to his military service.

Walter E. Belcher, manager of the Dallas district of New York Belting & Packing, has been placed on the retirement list after 51 years with the company. He will be succeeded by J. E. Conaway, an assistant to Mr. Belcher.

The latter began his career in the rubber business as an office boy and subsequently became a salesman of mechanical rubber goods. Before his appointment to the Dallas managership in 1921 he had served the company in Houston, New Orleans, and Boston.

Mr. Conaway, a native of Memphis and a graduate of the University of Mississippi, is well known in industrial circles throughout the South. As manager of the Dallas district he will have supervision over sales in Texas, Louisiana, Mississippi, Arkansas, New Mexico, southeast Kansas, Oklahoma, and western Tennessee.

New York Belting & Packing Co., one of the country's oldest manufacturers of industrial rubber products, is observing the one-hundredth anniversary of its founding this year.

Opens New Laboratory

Witco Chemical Co., 295 Madison Ave., New York 17, N. Y., has opened a technical service laboratory at 719 First Ave., New York, under the direction of L. H. Cohan, formerly director of research for the Continental Carbon Co., a Witco subsidiary. The laboratory is equipped with the most modern facilities for studies in rubber, plastics, paint, and general chemical work.

The rubber division of the laboratory, in addition to the usual facilities—plasticity, stress-strain, tear, hardness, breaking set, permanent set, compression set, flex crack resistance, abrasion resistance, oxygen bomb aging, forced draft air oven aging, pendulum rebound, and heat generation apparatus—contains several innovations not ordinarily encountered. The physical testing is conducted in a room air conditioned for a temperature of $80 \pm 2°$ F. and $40 \pm 10\%$ humidity the year around. Curing is carried out in a press completely enclosed in a heavily insulated cabinet so that both the press platens and the immediately adjacent air space are maintained at constant temperature. Sample molds are all chromium plated, hinged, and provided with handles so that cavity surfaces cannot be scratched or dented during use. Also of interest to rubber technologists is a hydraulic press specially adapted for dieing out test samples with continuously smooth action, which produces a cut edge consistently free from imperfections.

Inserting a Mold into the Curing Press in the Rubber Compounding and Testing Division of the Witco Technical Service Laboratory. The Press Is Enclosed with a Plywood Frame and Four Inches of Glass Insulation Which Not Only Improves Working Conditions in the Press Room, but Also Insures Less Temperature Variability between the Press Platens.

The paint laboratory is equipped with a three-roll mill, ball and pebble mills, mixing equipment for batches up to five gallons, and apparatus for making the usual tests, such as tinting strength, color intensity, oil absorption, wet and dry hiding power, hardness of paint film, fineness of pigment, consistency, etc.

A separate publications department in the Witco technical service laboratory will prepare papers for scientific journals, manuals, bulletins, and technical service reports for use by the rubber, plastics, paint and other industries.

Westinghouse Electric International Co., Pittsburgh, Pa., according to Wm. E. Knox, president and general manager, has appointed Douglas C. Lynch assistant general manager. Associated with the company in New York and abroad since 1937, Mr. Lynch recently returned from a Westinghouse mission to the Near East, where he was in charge of an airport survey in Turkey and conducted other company business in Egypt. Mr. Lynch had been made manager of the special projects department in 1943, two years after he had joined the department in New York.

Robert Russell succeeds Mr. Lynch in the latter post. Formerly assistant manager of the department, Mr. Russell joined the Westinghouse Electric Corp. at its Mansfield, O., plant in 1933 and transferred to the International company at New York in 1935.

Intercontinental Rubber Co., Inc., 745 Fifth Ave., New York 22, N. Y., in its semi-annual report to stockholders revealed that during the spring 2,600 acres were planted to guayule, bringing the total under cultivation to nearly 6,500 acres. It is estimated that the nursery will produce one hundred million plants to complete the 10,000-acre program as originally planned. It is expected that it will take two to three years for the supply of cultivated shrub to offset fully the decreased supply of wild shrub. During the first half of the current yea the company produced 4,430,600 pounds of resinous guayule, against 7,174,800 pounds in the 1945 months. During the first six months of 1946, 278,300 pounds of deresinated guayule were produced, and 16,232 metric tons of shrub were milled, compared with 25,691 metric tons a year ago.

H. W. French Co., Inc., crude rubber brokerage, 347 Madison Ave., New York 17, N. Y., on August 12 announced that Samuel G. French had returned to his former position as president of the company. Mr. French had recently served in Washington as chief of the Rubber Section, Office of International Trade, United States Department of Commerce.

OHIO

The Oak Rubber Co., Ravenna, after a lapse of four years and four months, with the August, 1946, issue, resumes publication of its four-page house organ, "The Oak Leaf—A Breezy Bulletin From Balloondom," with Tom Gregory again editor. During the war Oak made raincoats and ponchos for the Armed Forces and meteorological balloons for the government. The company attributes the shortage of toy balloons today to strikes and secondary strikes—particularly the coal strike, which led to curtailed supplies of neoprene, from which toy balloons must be made today.

Lile Sun Factory Manager

Chester C. Lile, a veteran of 29 years in Akron rubber production, has been appointed factory manager for the Sun Rubber Co., Barberton, according to T. W. Smith, Jr., the company's general manager. Previous to joining Sun, a large producer of rubber toys, Mr. Lile was a production engineer for Firestone Tire & Rubber Co., and as such, started Firestone factories in Dallas and Paterson, N. J., and supervised plants at Zanesville, Coshocton, and New Castle, Pa. He has previously been on the production engineering and supervision staff of The B. F. Goodrich Co. and Miller Rubber Co.

Making his first contact with the rubber industry in 1917, Mr. Lile later aided in the development of the Banbury mixer and the Gordon plasticator. He also helped develop the type of rubber used in refrigerators and pioneered in the development of extruded products Mr. Lile is a veteran of World War I, having served with the 38th Division.

Sun also recently named Edward Mobley assistant designer in the development department reporting to B. A. McDermott, Sun's chief designer and

Chester C. Lile (Left) Conferring with T. W. Smith, Jr., Sun's General Manager

head of the department. Mr. Mobley, former Cleveland School of Art student and veteran of 40 months' service with the Army, will sculpture clay and plastic models for new designs of the Sunruco toy line; will also make layouts and work as a draftsman, designing new machine parts.

General Tire Story Featured

The story of how the war led General Tire & Rubber Co.,, Akron, into diversification of interests was told in an article entitled "General Tire on the Loose" in the July issue of *Fortune*. The story stressed the leadership of President William F. O'Neil in the establishment and growth of the company, its prewar conservative policy, its wartime diversification and production, and its present plans for expansion and growth. It was noted that General, which before the war had held almost exclusively to the production of tires, took wartime contracts for such varied products as gas masks, bomb casings, barrage balloons, lifeboats, ponchos, barges, mobile machine repair shops, and others. The success attained by the company in producing such diverse items laid the groundwork for its postwar expansion, which includes purchase of the Yankee Network radio broadcasting chain, work on jet-assisted take-offs for planes and military missile rockets, production of "iron lungs" made of hard rubber, and a new type of hospital bed, its partnership with the Liquid Carbonic Corp. in producing a combination refrigerator and frozen-food storage cabinet, and its purchase of the Pennsylvania Rubber Co. and 48% interest in the Mansfield Tire & Rubber Co.

The Timken Roller Bearing Co. Canton 6, has appointed R. E. Wagenhals, formerly quality control engineer, director of quality control for all bearing divisions of the company. Mr. Wagenhals, who has been with Timken since 1943, will coordinate all quality control activities involved in the manufacture of Timken bearings.

The steel and the tube division also recently named three district sales engineers—Sherman R. Lyle, Cleveland district; Wm. Earle Bryden, Chicago; and Alfred J. Kinnucan, New York.

Has Interest in Dutch Concern

International B. F. Goodrich Co., Akron, is participating in the financing and operation of a new automobile tire factory to be founded in The Hague in cooperation with N. V. Rubberfabriek Vredestein (Vredestein Rubber Factor, Inc.), Loosduinen, it was announced recently by E. L. C. Schiff, Jr., manager of the Dutch concern. The new enterprise, to be known as N. V. Nederland-Amerikaansche Autobandenfabriek Vredestein (Netherlands-American Auto Tire Factory Vredestein, Ltd.), is expected to begin production at the rate of about 100,000 tires and tubes a year by the end of July, 1947, Mr. Schiff said. Machines are already on order in the United States.

The capital is being supplied by Goodrich and Vredestein although the public will be permitted to purchase stock, he continued. Technical knowledge, and patents and experience of the American firm will be made available to the new company, and American experts will supervise production.

Total capitalization, he stated, will be 6,000,000 guilders (about $2,268,000), of which Goodrich and Vredestein will absorb half; while the remainder will be offered to the public on the open market. Part of the latter however, has already been placed, Mr. Schiff explained. The remaining shares will be offered to the public through the Netherlands' Trading Society, Heldring & Pierson, and Labouchere & Co.

Mr. Schiff will be managing director of the enterprise. (S. W. Caywood, president of International Goodrich, announced in New York last month that Alfred Cutler, Goodrich's European sales manager, would become sales manager for the Netherlands, supervising export to the European trade.)

The tires to be produced by the factory will be made half of natural and half of synthetic rubber, and a first shipment of natural rubber sheets from Netherlands India for the factory is understood to be already on its way to The Hague.

Pharis Tire Announcements

Pharis Tire & Rubber Co., Newark, has announced that increased wear and longer mileage of its tires are assured with the installation of the new Waldron cord treating unit in the company's plant. Fabric treated with this machine is said to be superior to that received from outside sources throughout the war. This installation was made at a cost of approximately $100,000, in space made available by a recently completed structural addition to the plant. According to the Pharis development department, the Waldron process increases adhesion of the skim coat to the cord by 50%, increases stone bruise resistance by 10%, and strengthens the individual cord by about 5%. Crude rubber latex is now used on the rayon fabric which, in addition to strengthening the adhesion and stone bruise resistance, also provides a fabric which processes much better through the calenders.

Ernest A. Moller has been appointed sales manager of the Pharis company, according to Hynes Pitner, vice president in charge of sales. Prior to joining Pharis, Mr. Moller for the past 18 years was with the Goodyear Tire & Rubber Co. in sales work, most recently as manager of the cycle tire sales department. His tire selling experience began as field representative in the auto tire division in the Boston district in 1928. Since that time he has served in the service store, petroleum sales, as supervisor in the wholesale tire departments, and as supervisor of tire sales in the Baltimore district. A native New Englander, a member of Phi Psi, and a graduate of Lowell Textile Institute, he is married and has two daughters. He is secretary of the Cycle Parts Accessories Association Division of the Bicycle Institute of America.

Ed. L. Galleher has been appointed sales promotion manager at Pharis. Recently released from the Navy as a lieutenant, Mr. Galleher was a Midwest zone advertising manager for the Firestone Tire Rubber Co. before the war. During his eight years with Firestone he also managed a service store and served a wholesale territory.

Streamlines Departments

"After a careful comprehensive study, we have reorganized our advertising and merchandising departments and effected changes that will result in better coordination, greater efficiency and service to our company and its independent merchants," Col. J. L. Cochrun, vice president in charge of Seiberling Rubber Co., Akron, announced last month.

Heading the two departments and coordinating all advertising and merchandising is the director of advertising and merchandising, G. F. Weisenbach, formerly advertising manager. The managers of the two departments are H. W. Julian, merchandising manager, and E. H. Cook, advertising manager. The advertising department will handle all advertising, sales promotion, identification, and production of sales materials; while the merchandising department will be responsible for merchandising plans, displays, store planning, and point of sales merchandising help.

New Seiberling "Plow Contour" Tractor Tire Being Examined by C. W. Seiberling, Executive Vice President, and Stan Elliott, Assistant Manager of the Agricultural Tire Sales Department

Meldrum and Fewsmith, the Seiberling agency, is represented by E. T. Morris and Norton Weber. The agency works with the director of advertising and merchandising and advises on all distribution problems.

Seiberling has also announced a new "Plow Contour" farm tractor tire, which uses new principles of traction developed by company engineers. The tire, which has extra-deep curved lugs, is expected to revolutionize the farm tractor tire field. The new tire was officially unveiled on August 29 as part of ceremonies at the Seiberling Country Club, near Akron.

Expands Footwear Merchandising

Creation of a new shoe products sales division of The B. F. Goodrich Co., Akron, to merchandise all products the company makes that are used in the manufacture or repair of shoes was announced last week by James J. Newman, vice president. Fred A. Lang, widely known in the shoe trade, has been appointed general manager of this new division.

With the move Mr. Newman also announced a new Goodrich "Silvertown" branded replacement rubber heel to be offered along with the extensive Hood line of shoe repair products, including leather and findings, that will be marketed through this new division.

Previous to the new merchandising plan Goodrich had concentrated its sales efforts primarily on rubber and plastic soles and heels to manufacturers of shoes. These products will be augmented by a line of new upper materials, midsoling, adhesives, and miscellaneous products used by shoe manufacturers.

The company has been in the sole and heel business for approximately 50 years. Hood has been engaged in this field since 1921, concentrating in recent years on the replacement trade.

Products sold by the new division will be manufactured in Goodrich plants at Clarksville, Tenn., Marietta, O., and Akron.

Hood will continue to manufacture and sell rubber footwear including overshoes of many types for men, women, and children, and boots and sport shoes.

Mr. Lang, with Goodrich since 1926, had been for the last three years merchandise manager of the industrial products sales division. He had been manager of the heel and sole sales department several year before that and has held other executive posts with the company.

A. J. Baker has been appointed manager of rubber thread sales of the Goodrich company, succeeding Karl Ryan, resigned. Manager of the Du Bois, Pa., plant, which has processed rubber thread and thread products since April, 1944, when the plant opened, Mr. Baker has had much experience in this field since he joined Goodrich in 1927. He was general foreman and later production manager of the golf ball department several years. He also had served as administrator of the war production drive committee and as manager of factory personnel.

C. J. Phillips succeeds Mr. Baker as manager of the Du Bois plant. With the company since 1920, he had been production superintendent of its Clarksville, Tenn., plant since 1939.

Waldo L. Semon, director of pioneering research for Goodrich, spoke on "Research Looks Ahead" before the Rotary Club of Los Angeles, Calif., July 5. Dr. Semon discussed the pioneering research and development work being conducted by the rubber industry in many fields of application. The selective flotation agents used in new mining processes are mostly chemicals also used in the rubber industry, which acted as the greatest supplier of these chemicals in the early days until their manufacture by specialized chemical companies. The stretching of rayon fibers during the spinning and drying processes was a development that gave a rayon fabric superior to cotton for use in truck and other heavy-duty tire cords. Wartime plant breeding experiments in California and improved methods of extracting the rubber indicate that a high grade of guayule rubber can be produced in the West and Southwest by the use of mechanical cultivation equipment. Research in the rubber industry has also developed entirely new kinds of plastics, such as Koroseal, that find a multitude of uses in wide fields of application. Dr. Semon pointed out that the synthetic rubber industry exemplified new developments arising from research. He stated the Goodrich research laboratories had been experimenting on the manufacture and use of synthetic rubbers for 30 years prior to Pearl Harbor and had made at that time 14,492 different types. The speaker noted that the quality of present-day synthetic rubber leaves little to be desired; while present synthetic rubber inner tubes are much superior to prewar natural rubber tubes. Commercial synthetic rubber is relatively new, Dr. Semon stated, and research still sees many opportunities for improving the product.

Adding to Rim Plant

Ground was broken recently for a $380,500 addition to the rim plant of The Goodyear Tire & Rubber Co., Akron 16. J. G. Swain, manager of the rim division, said the plant is being enlarged to meet the increased demand for steel rims for farm tractors and farm machinery.

Goodyear Personnel Activities

Goodyear last month made two additions to its research staff, Warren W. Burr and Stella Alogdelis. Mr. Burr, paint, varnish, and lacquer expert who served as a naval officer in World War II, will head up the section on development of protective coatings and Pliolite resins. Prior to entering the service in 1943, Mr. Burr served as vice president of the Moran Paint Co. During the latter part of his naval career, he served as technical adviser in production of a film on painting naval aircraft.

Miss Alogdelis, who formerly held a research fellowship in malaria at the University of North Carolina, will work in the synthetic rubber research section on development of new and improved polymers. Prior to joining Goodyear, she was affiliated with the Akron City Health Department.

Several personnel changes in the field sales organization were announced recently by Goodyear.

Earl C. Flinn was named assistant district manager of the Northcentral division at Detroit. Formerly assistant to the division manager in Chicago, Mr. Flinn was replaced by M. E. Ford, previously merchandising school instructor in Akron. That post has gone to J. H. Stephens, Jr., district manager of Goodyear aviation products sales in Baltimore and Washington since 1941.

Harry M. Caruthers was made assistant to the Southcentral division manager at Dallas, Tex. Former salesman in the Pine Bluff, Ark., territory, Mr. Caruthers replaced O. S. Whitaker recently made assistant district manager at Kansas City.

C. B. Chambliss has been named field staff operating supervisor of Goodyear's highway transportation division. Mr. Chambliss has spent his entire 24 year's service in the company's squadron training program, including 16 years at Goodyear's New Toronto, Canada, factory. Since 1942 he has been production squadron manager in Akron.

Succeeding Mr. Chambliss in that capacity is Edward F. Schmitt, who joined the company in 1934 and in 1941 won the P. W. Litchfield Medal as the outstanding production squadron graduate. During the war Mr. Schmitt was a department head at Goodyear Aircraft Corp.

Max F. Moyer has been named manager of the motorcycle, bicycle, and toy tire department at Goodyear, succeeding E. A. Moller, resigned. Mr. Moyer returned to Goodyear in 1946, following his separation from the United States Army Air Force, in which he served as a colonel; he had been an aviator (airship) in the first World War. Mr. Moyer joined Goodyear in 1926 in the sundries department and was one of the original staff of the flooring department. Well known in ballooning, he took part in the National Balloon races in 1923 and 1924 and in the James Gordon Bennett International Balloon races from Brussels in the latter year. He reentered the military service in May, 1942. Upon his return to Goodyear early this year, Mr. Moyer was made assistant manager of the builders supply department of the chemical products division.

Reassignments in the Pliofilm packaging sales department to handle the increased demands for this material in the frozen food field were announced recently by A. F. Landefeld, Pliofilm sales manager of the chemical products division. Frazer E. Wilson, handling Akron territory sales, has been named specialist in the frozen food field, and R. H. Kilgore, in training at Akron for the past eight months, has replaced Mr. Wilson in the Akron territory. Both men will continue to headquarter in Akron and to report to A. B. Clunan, manager of the direct packaging sales, Pliofilm department.

Mr. Wilson joined Goodyear in 1941 on the production squadron, later becoming a squadron instructor. He served several years as a technical service man before joining the Pliofilm sales department as a field representative in New York. He returned to Akron last year.

Mr. Kilgore, recently returned from service as a B-29 instructor for the AAF, first joined the company on miscellaneous work in 1937. He was assigned to Pliofilm sales upon his return from military service.

A. E. Polk, district field manager of highway transportation for Goodyear at Washington, D. C., recently completed 30 years with the company. He began as a tire repair man in 1916. Later he was placed in charge of the company's tire repair operations at Chicago and

still later served as district field representative of highway transportation in Philadelphia. He was named district field manager at Baltimore and Washington in 1943.

C. R. Langdon, Goodyear Tire manager of sales and office personnel, last month completed 30 years with the company. A native of Akron, Mr. Langdon attended the University of Washington and began his Goodyear career as a production worker in 1916. Later he became a member of the training squadron, was transferred to the California plant in 1919, and served in various sales positions on the West Coast until returning to Akron as sales school manager in 1928. Later he was petroleum sales manager in California, district manager at Sacramento, and then in Cincinnati. He again returned to Akron in 1936, as manager of retail stores, and was appointed to his present post in 1939.

Charles J. Roese, veteran Goodyear engineer and technical superintendent of the company's California plant, retired effective August 1. A native of Buffalo, N. Y., Mr. Roese graduated from Cornell University with a mechanical engineering degree in 1916, and immediately began his Goodyear career in Akron, in the experimental department. Veteran of World War I, he served as assistant manager, tire and rim section, motor transport corps. Following the war, he returned to Goodyear and was transferred to California in 1920 as a member of the original staff at the company's then-new plant in Los Angeles, later becoming development manager there. Transferred to Akron in 1928 as superintendent of Plant 2, tire division, he spent a year in special design work, during which time he invented the circle-unit principle for volume production of automobile tires. He returned to Los Angeles as superintendent in 1938. During World War II, Mr. Roese went to England as a member of a special mission investigating tire production for American airplanes.

Kline Advanced

Industrial Rayon Corp., Cleveland, at its board meeting last month elected Hayden B. Kline to the newly created post of executive vice president and to membership on the executive committee, which was increased from three to four. Mr. Kline, who joined the company as a research chemist in 1925 and was the leading figure in the development of the company's method for continuous spinning and processing viscose rayon filament yarns, has been vice president of the company since 1930 and a director since 1933. A native of Denver, Colo., and a graduate of Massachusetts Institute of Technology, he is a member of the American Chemical Society, American Institute of Chemists, American Institute of Chemical Engineers, American Association of Textile Chemists & Colorists, Chemists Club (New York), and the American Association for the Advancement of Science.

At the same time directors of Industrial Rayon increased the quarterly dividend rate on common stock from 37½¢ a share to 50¢ a share, payable September 11 to stockholders as of August 28. This change brings the annual dividend rate to $2 a share on the new common stock, which was issued

Hayden B. Kline

April 1 on a basis of two shares for each share of the old no-par common stock. Last year this stock paid $2.

Acquires Synthetic Rubber Plant

B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, a division of The B. F. Goodrich Co., Akron, has acquired a war emergency synthetic rubber plant in Louisville, Ky., from the government. W. S. Richardson, president of the chemical company, confirmed the transaction, constituting the first disposal to industry of a government synthetic rubber copolymer plant. The Louisville plant had been classified by the government as a "fringe plant" that is not felt to be essential to the long-term security program for rubber.

Goodrich, a pioneer manufacturer of man-made rubber designed and built the Louisville plant for the government in 1942. The plant will continue to produce general-purpose rubber for the government for a period at no added cost, although a portion of the manufacturing facilities will now be reconverted by Goodrich Chemical for the manufacture of its Geon polyvinyl resins, Mr. Richardson said.

Goodrich also operates synthetic rubber plants in Borger and Port Neches, Tex., for the government.

NEW ENGLAND

Converse Rubber Co., Malden 48, Mass., has announced that on July 31 the consolidation of the Converse company and Athco Sales Co. was approved at meetings of stockholders of both concerns. The consolidation has resulted in a new corporation known as Converse Rubber Corp. The officers and directors of the former Converse company continue without change as officers and directors of the new corporation.

B. D. S. Industries, Inc., 73 Wallace St., New Haven, Conn., recently was organized to offer pulverizing and grinding services to the rubber pigment and plastic trades. Officers and directors are Robert M. Blake, president and chairman of the board; J. H. Davidson, vice president and sales manager; and G. F. Steele, secretary-treasurer. Mr. Blake is also president of the Elm City Rubber Co., New Haven; while Mr. Davidson for many years had been sales engineer with Farrel-Birmingham, Inc., Ansonia, Conn.

Quincy Products Co., Inc., 100 Edison Pk., Quincy 69, Mass., recently was organized to manufacture molded rubber and plastic products, soles and heels, and coated fabrics. Officers of the new concern include Howard H. Berger, president; Irwig W. Porges, vice president; and S. G. Rosenberg, treasurer. Mr. Berger gained his experience in the rubber manufacturing industry while with Plymouth Rubber Co., Canton, Mass.; Middletown Rubber Co., Inc., Middletown, Conn.; and General Cable Corp., Bayonne, N. J.

Canfield Changes

H. O. Canfield Co., manufacturer of industrial rubber and synthetic rubber parts, Bridgeport, Conn., according to Charles Wyman, executive vice president, has appointed A. J. Youmans head of the personnel department. He comes to the company with a strong background in molded rubber goods and personnel experience after four years as personnel director of the Freydberg Bros.-Strauss Co. in Connecticut and eight years as senior time-study engineer with the United States Rubber Co., Passaic, N. J. Trained at New York and Rutgers Universities in industrial engineering, Mr. Youmans is a successful innovator of a number of new systems in industrial relations and time study. He is also an officer in the State of Connecticut Labor-Management Council and a member, besides, of the Bridgeport Personnel Association.

John D. Foley, former superintendent of the Remington Arms plant in Bridgeport, Conn., has been appointed works manager of the Canfield company. Mr. Foley, a graduate of New York University, College of Engineering, was with Remington for the past nine years. During the wartime period he was connected with one of the largest expansion programs undertaken by any industry in the country when Remington grew from approximately 6,000 employes to 8,100 employes. Mr. Foley plans to introduce modern management methods at the Canfield.

H. O. Canfield Co. recently opened a New York sales office at 444 Madison Ave., New York 22, with E. R. Staley, general sales manager, in charge it was announced by Charles A. Wyman, executive vice president of the company. According to Mr. Wyman, this new office has been established to afford greater convenience for manufacturers and representatives in a variety of industries serviced by the Canfield company. Mr. Staley will handle all sales functions at the New York office.

Dayton Rubber Mfg. Co., Dayton, O., has appointed Joseph L. Davis, New England manager of its textile products division, according to J. O. Cole, textile division manager. Mr. Davis will make his headquarters at the firm's Boston, Mass., office.

MIDWEST

Purchases Adhesive Division

Murray Stempel, vice president and general manager, Paisley Products, Inc., 1770 S. Canalport Ave., Chicago 16, Ill., announced August 7 that his firm had purchased the adhesive division of Certified Products Co., 2624 W. Taylor St., Chicago. The purchase includes all formulas, manufacturing processes, raw materials, and finished products. But no processing machinery was included as Paisley plans to transfer all manufacturing to its plant, now undergoing extensive interior alterations to expand production facilities.

Paisley operations have continually grown since the firm was started in 1931. During the war the product line was expanded to include synthetic resin and rubber emulsion cements, thermoplastic resins, and similar products. The original product line of starch and dextrine glues and pastes and animal glue products has also grown.

Paisley Products, Inc., is a subsidiary of Morningstar, Nicol, Inc., 630 W. 51st St., New York, N. Y., where the Paisley Products eastern manufacturing division is also located.

Sales offices of the Chicago division are maintained in Cleveland, Indianapolis, New Orleans, Dallas, Atlanta, and Kansas City.

Van Cleef Bros., manufacturer of rubber products since 1910, Woodlawn Ave., Chicago 19, Ill., which has been operating as a partnership for many years, has decided to conduct the business as a corporation in order to make sure of maintaining its continuity. Accordingly, effective August 1, by virtue of a charter issued by the State of Delaware, Van Cleef Bros., Inc., succeeded to the business of Van Cleef Bros. partnership, taking over all the business assets and assuming all obligations. Officers of the company are Noah Van Cleef, president and treasurer; Felix Van Cleef, vice president; and Paul Van Cleef, vice-president and secretary. There will be no change in management or policies of the business.

Monsanto Chemical Co., St. Louis, Mo., has appointed F. Faxon Ogden manager of special products sales development and J. J McCarthy manager of chemical sales development in charge of new products for the paper and leather industries, both in the Merrimac Division, Boston, Mass. Mr. Ogden was formerly manager of chemical sales development. In his new capacity he will specialize in the marketing of Santocel, a silica aerogel which Monsanto describes as the most efficient thermal insulant ever tested. Mr. McCarthy was formerly manager of textile sales development.

Eric Bonwitt, dealer in used machinery for the rubber industry, on September 3 moved his Akron, O., office to 431 S. Dearborn St., Chicago, Ill. Telephone Webster 3548.

PACIFIC COAST

Erecting Latex Plant

Robert A. Lees has been named manager of the American Anode, Inc., plant being constructed in Los Angeles, Calif., and expected to be in operation late this fall, it is announced by Robert V. Yohe, Anode president.

The plant will manufacture latex compounds and mixes for all purposes, for sale in the area west of the Rocky Mountains. It will, it is claimed, be the only plant of its kind in the Pacific Coast area. All synthetic latices and natural rubber latex will be available in the plant, and compounds for all purposes, including dipped goods, metal coatings, paper and textile treatments, and adhesives will be manufactured there.

In full production the plant will produce approximately 4,000,000 pounds of finished latex compounds annually, with a complete testing laboratory for customers' problems to be installed in the new plant.

Los Angeles' location provides port facilities closer to the East Indies, principal source of natural rubber latex. Storage facilities for 30,000 gallons of latex, equivalent to 150,000 pounds of dry rubber, are included in the plant.

Mr. Lees received his A.B. and master's degree in chemistry from Oberlin College and during his graduate study was an assistant in the chemistry department of the school. He joined American Anode, Akron, as a chemist in 1929 and for six years worked on research and development problems. He has been production manager since 1935 and recently served as consultant to the Rubber Bureau of the Office of CPA on latex compounding and use.

The Firestone Tire & Rubber Co. of California, Los Angeles, Calif., through President Leonard K. Firestone, has announced that James J. Robson, recently discharged from the Army with the rank of lieutenant colonel, has been made manager of the West Coast division of the manufacturers' sales department. He will make his headquarters at Los Angeles and be assisted by Fred W. Shaw, who will be stationed at the San Francisco offices of the company. Mr. Firestone explained that rapid growth of the automotive industry in the area has made the establishment of this new division necessary. Mr. Robson joined Firestone in 1932 after graduation from Massachusetts Institute of Technology and has been with the company continuously since then except for the war period.

W. J. Voit Rubber Co., has received a building permit for construction of a cooling tower at its plant at 1600 E. 26th St., Los Angeles, Calif., to cost $6,080.

Burke Rubber Co., 702 Sunol St., San Jose 10, Calif., is adding a steel beam, brick-walled building of 3,200 square feet to its present plant. This addition will be used as a compounding room, which will include a Banbury mixer, two mills, a tuber, and stock cooling system. The building is scheduled to be completed and equipment in operation by October 1. The company's plans also include a small experimental department in order better to conduct Burke's experimental work. These two new facilities will allow the firm to compound the synthetics as well as natural rubber, permitting Burke to operate its present mechanical molding department with even greater efficiency.

Morton Paul Schapp has resigned as assistant treasurer of Pepperell Mfg. Co., with which he had been associated 20 years, to organize a new corporation which will merchandise and distribute a group of consumer products of Koroseal on the West Coast. Headquarters of the new concern will be in Los Angeles, Calif., with offices in San Francisco and Seattle.

United Rubber Co., 821 Traction Ave., Los Angeles, recently damaged by fire, has received CPA approval for reconstruction of its factory building, at a cost of $40,000.

CANADA

Polymer Corp., Sarnia, Ont., through J. R. Nicholson, vice president and managing director, has announced that L. D. Dougan, assistant manager, has been assigned additional duties which include overall charge of all production at the plant. At the same time Mr. Nicholson reported that E. K. Lewis, director of production, has returned to Imperial Oil, Ltd., on a special assignment. In a rearrangement of responsibilities G. E. Evans, process superintendent, also has been given important additional duties.

Besides three process foremen have been promoted to take charge of the units with which they are associated. Now bearing the title of unit supervisor, they are: A. R. Powell, feed preparation units; C. J. Fitzgerald, butadiene units; and Graham Smith, Butyl unit.

The freighter *Scottish Prince* arrived at Halifax, N. S., on August 13 carrying the first shipment of crude rubber, 3,000 tons, to reach Canada directly from the Malay States since 1940. The greater part of the crude rubber was consigned to Polymer Corp., Sarnia, Ont., but a portion of the cargo was for H. A. Astlett & Co., New York, N. Y., U.S.A.

FINANCIAL

American Cyanamid Co., New York, N. Y. Six months ended June 30: net income, $4,261,869, equal, after preferred dividends, to $1.44 a common share, compared with $3,097,639, or $1.01 a share, in the corresponding period last year; provision for income taxes, $3,100,000, against $7,300,000.

American Zinc, Lead & Smelting Co., Columbus, O., and wholly owned subsidiaries. First half: net loss, $120,262, against net profit of $445,345 in the 1945 months.

Baldwin Locomotive Works, Philadelphia, Pa., and subsidiaries. Year ended June 30: net income, $3,632,297, equal to $1.85 a common share, against $4,402,432, or $2.63 a share, for the preceding 12 months.

Belden Mfg. Co., Chicago, Ill. Six months to June 30: net income, $288,038, equal to $1.09 each on 265,300 shares, contrasted with $231,267, or 96¢ each on 241,547 shares, in the 1945 half; net sales, $5,472,125, against $5,867,352.

Brown Rubber Co., Inc., La Fayette, Ind. First six months, 1946: net profit, $154,626, equal to 61¢ each on 251,100 shares outstanding; sales, $1,329,977, almost as great as that of any previous whole-year period in the company's history.

Canada Wire & Cable Co., Ltd., Leaside, Ont. First half, 1946: net profit, $314,086, against $296,000 a year ago.

Columbian Carbon Co., New York, N. Y. Initial half, 1946: consolidated net earnings, $2,668,191, equal to $1.65 a share, against $1,671,362, or $1.04 a share, in the same period last year.

Copper Tire & Rubber Co. (formerly Master Tire & Rubber Corp.), Findlay, O. Four months to April 30: net profit, $129,176, equal to 82¢ each on 156,721 shares; net sales, $3,310,721. For 1945: net profit, $308,375, equal to $1.97 a share; net sales, $9,262,199.

Crown Cork & Seal Co., Inc., Baltimore, Md., and wholly owned domestic subsidiaries. First half, 1946: net income, $2,207,245, equal to $1.54 each on 603,895 common shares, against $1,380,535, or $2.18 each on 517,625 common shares, in the first six months of 1945: provision for taxes, $952,600, against $1,169,797.

Dewey & Almy Chemical Co., Cambridge, Mass. First six months, 1945: consolidated net profit, $331,869, equal to 91¢ each on 307,215 outstanding shares, contrasted with $312,868, or 93¢ a share, a year ago; net sales, $5,903,553, against $6,053,647.

Dow Chemical Co., Midland, Mich., and subsidiaries. Year ended May 31, 1946: net income, $6,148,976, equal, after preferred dividends, to $3.95 each on 1,248,706 common shares, contrasted with $8,738,762, or $6.02 a share, in the preceding fiscal year; sales, $101,813,839, against $124,570,201; net provision for taxes, $2,144,180, against $16,267,980.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and wholly owned subsidiaries. First six months, 1946: net income, $55,731,895, equal, after preferred dividends, to $4.67 each on 11,121,962 common shares outstanding, compared with $13,688,670, or $2.92 each on 11,173,755 shares outstanding, a year earlier; provision for taxes, $28,040,000, against $60,450,000.

Flintkote Co., New York, N. Y., and subsidiaries. Twenty-eight weeks to July 13: net income, $1,824,878, equal to $1.38 each on 1,183,921 common shares, compared with $1,241,089, or $1.07 each on 1,033,921 shares, in the 1945 period; net sales, $26,171,860, against $20,252,122; taxes, $1,143,227, against $905,892.

Electric Storage Battery Co., Philadelphia, Pa., and wholly owned subsidiaries. Six months to June 30: net income, $1,533,940, equal to $1.69 a share, against $1,046,278, or $1.15 a share, in the 1945 half; provision for taxes and contingencies, $1,138,018, against $3,398,168.

Goodyear Tire & Rubber Co., Akron, O. First half, 1946: net profit, $15,088,189, equal to $6.59 a common share, contrasted with $7,509,868, or $2.90 a common share, a year earlier; consolidated net sales, $282,736,171, against $407,991,835, reserve for foreign investments, $4,000,000, against $2,500,000 reserve for property adjustments and contingencies in the 1945 half; current assets, June 30, $197,715,223, current liabilities, $39,776,546, compared with $190,417,353 and $37,945,338, respectively, on December 31, 1945.

Hewitt-Robins, Inc., Buffalo, N. Y. June quarter: net earnings, $172,594, or 62¢ a share, against loss of $417,733 in the March quarter.

Hydraulic Press Mfg. Co., Mt. Gilead, O. First six months: net income, $257,502, equal to $1.48 each on 166,017 common shares; net sales, $3,173,251.

Intercontinental Rubber Co., Inc., New York, N. Y., and subsidiaries. Six months to June 30: net income, $90,304, against $372,482 in the same months a year ago; net sales, $221,688, against $671,422; provision for income taxes, $41,897, against $191,949; current assets, June 30, $2,141,915, current liabilities, $305,060, against $2,123,063 and $198,110, respectively, on December 31, 1945.

Monsanto Chemical Co., St. Louis, Mo. First half: net income, $6,185,234, equal to $4.45 a common share, contrasted with $3,051,895, or $1.95 a share, in the like period last year; provision for taxes, $4,015,617, against $7,957,811.

National Lead Co., New York, N. Y., and wholly owned domestic subsidiaries. Six months ended June 30: net profit, $5,069,455, equal to $1.31 a common share, compared with $3,475,845, or 79¢ a share, in the first half last year; provision for taxes, $3,580,786, against $6,447,842; sales $78,910,059, against $90,006,931.

New Jersey Zinc Co., New York, N. Y. First six months: net profit, $2,331,968, equal to $1.19 a share, against $2,674,957 or $1.36 a share, a year ago.

Pittsburgh Plate Glass Co., Pittsburgh, Pa. Six months ended June 30: net income, $8,162,622, equal to 92¢ a share, compared with $7,036,620, or 79¢ a share, in the 1945 period net sales, $82,;508,192, against $79,349,514.

St. Joseph Lead Co., New York, N. Y., and subsidiaries. First six months: net income, $2,793,060, against $2,845,384; net sales, $26,356,461, against $24,760,339.

Timken Roller Bearing Co., Canton O. First half, 1946: net loss, $991,541, against a net profit of $2,931,865 in the same period last year.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Armstrong Rubber Co.	"A" & B"	$0.25 incr.	Oct. 1	Sept. 16
Armstrong Rubber Co.	Pfd.	0.59⅜ init. q.	Oct. 1	Sept. 16
Boston Woven Hose & Rubber Co.	Com.	0.50 q.	Aug. 26	Aug. 15
Brunswick-Balke-Collender Co.	Com.	0.25	Sept. 16	Sept. 3
Canadian Tire Corp., Ltd.	Com.	0.25 incr. q.	Sept. 1	Aug. 20
Canadian Wire & Cable Co., Ltd.	"A"	1.00 q.	Sept. 15	Aug. 31
Canadian Wire & Cable Co., Ltd.	"B"	0.25 q.	Sept. 15	Aug. 31
Dewey & Almy Chemical Co.	Com.	0.35	Sept. 16	Aug. 31
Dewey & Almy Chemical Co.	"B"	0.35	Sept. 16	Aug. 31
Flintkote Co.	Com.	0.15	Sept. 10	Aug. 24
Flintkote Co.	Pfd.	1.00 q.	Sept. 16	Aug. 31
General Motors Corp.	Pfd.	1.25 q.	Nov. 1	Oct. 7
General Motors Corp.	Com.	0.50	Sept. 10	Aug. 15
General Tire & Rubber Co.	Com.	0.25	Aug. 30	Aug. 20
Hewitt-Robins, Inc.	Com.	0.25 q.	Sept. 14	Aug. 28
Johnson & Johnson	Com.	0.10 s.	Sept. 14	Aug. 29
Okonite Co.	Com.	1.00 q.	Aug. 1	July 17
Philadelphia Insulated Wire Co.	Com.	0.10 redc. s.	Aug. 15	Aug. 1
Thermoid Co.	Com.	0.15 q.	Sept. 16	Sept. 5
Union Asbestos & Rubber Co.	Com.	0.17½	Oct. 2	Sept. 10
U. S. Rubber Reclaiming Co.	8% Pr. Pfd.	0.50 accum.	Sept. 4	Aug. 22
S. S. White Dental Mfg. Co.	Com.	0.35 q.	Aug. 13	July 29

Patents and Trade Marks

APPLICATION

United States

2,401,299. **In Apparatus for Molding and Gluing, Including an Open-Ended Container, a Flexible, Impermeable Membrane Arranged to Form within the Container Two Chambers in the Lower of Which Is a Hollow Mandrel within Which Is a Flexible, Impermeable Bag.** R. E. Glavin, Bristol, Tenn., assignor to Universal Molded Products Corp., Bristol, Va.

2,401,325. **Foundation Garment Having Elastic Sections.** P. Amyot, Quebec, P. Q., Canada.

2,401,379. **Spring Loaded Seal Assembly for Sealing a Movable Shaft.** T. R. Smith, assignor to Maytag Co., both of Newton, Iowa.

2,401,415. **Masking Structure Including an Annular Body of Resilient Material.** J. E. Duggan, Birmingham, Mich.

2,401,449. **In a Resilient Mounting Including a Receiving Member Having a Conical Socket, an Element of Resilient Material, such as Rubber, Seated in the Socket and Fixed Relative to the Conical Surface of the Socket.** T. L. Yates, assignor to Lord Mfg. Co., both of Erie Pa.

2,401,514. **Arch Support Made from a Thermoplastic Resin.** W. M. Scholl, Chicago, Ill.

2,401,539. **In a Seal for Use between Rotatable Coaxial Hub and Shaft Members, a Tapered Ring of Rubber-Like Sponge Material, to the Tapered End of Which Is Bonded a Solid, but Yieldable Sealing Ring of Rubber-Like Material.** G. L. Benson, Lodi, O.

2,401,552. **Window Construction Including Two Panels of Laminated Glass Bonded by a Laminated Interlayer of Relatively Soft Deformable Organic Plastic and a Center Sheet of Tough, Resilient Plastic; the Interlayer Extends beyond the Edges of the Glass to Form a Flange; and to Connect the Interlayers of the Two Panels Is a Bridge of Plastic Material.** S. F. Cox, Pittsburgh, Pa., assignor to Pittsburgh Plate Glass Co., Allegheny County, Pa.

2,401,554. **Sewer Pipe Joint Having a Bell and Spigot; the Bell Has a Lining Molded therein, and the Spigot a Rubber Band Adapted to Be Carried into the Bell Lining in Assembling the Joint.** E. M. Davids, assignor to Gladding, McBean & Co., both of Los Angeles, Calif.

2,401,564. **In Apparatus for Making Hollow Thermoplastic Ware Including an Annular Supporting Surface and a Tubular Valve Head, a Sealing Gasket of Compressible and Expansible Material between Head and Surface.** V. E. Hofmann, Toledo, O., assignor to Owens-Illinois Glass Co., a corporation of O.

2,401,595. **In a Gas-Filled Cable System, Two Cable Sections, Each of Which Includes an Impervious Sheath Having an Insulated Conductor and a Gas Passage therein.** L. Wetherill, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,401,624. **Inflatable Gasket.** W. E. W. Petter, Yeovil, M. Macey, Widgery, and S. T. A. Richards, Yeovil, assignors to Dunlop Rubber Co., Ltd., London, all in England.

2,401,627. **Self-Supporting Puncture-Sealing Gas Tank.** E. Eger, Grosse Pointe Park, Mich., assignor to United States Rubber Co., New York, N. Y.

2,401,638. **Tubular Thermoplastic Pellet for Vacuum Sealing a Receptacle.** C. Herzog, Belleville, and P. A. Hauck, Union, both of N. J., assignors, by mesne assignments, to themselves as joint tenants.

2,401,824. **A Fitting for Connecting Threaded Members of Objects of Various Surface Curvature Including a Body of Tough Material and a Base Member of Deformable Plastic Material.** J. N. Gladden and L. Zielinski, both of Glendale, Calif.

2,401,987. **In Hot Bonding a Metal Sheet to a Material Having a Low Coefficient of Thermal Expansion, the Use of a Layer of Curable Adhesive between the Material and the Metal Sheet.** W. H. Taylor and R. L. Jones, II, assignors to Wingfoot Corp., all of Akron, O.

2,401,990. **Generally Cylindrical Structure of Woven Fabric, Adapted to Be Inflated.** W. T. Van Orman, assignor to Wingfoot Corp., both of Akron, O.

2,401,995. **Furniture with Inflatable Upper and Lower Seat Cushions.** S. J. Weinzimmer, New Rochelle, N. Y.

2,401,996. **Terminal for a Gas-Filled Cable.** L. Wetherill, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,402,039. **In Composite Lamellar Tubing, Polymerized Plastic Bonding Means.** P. R. Goldman, Andover, assignor to Plymold Corp., Lawrence, both in Mass.

2,402,042. **Track for Self-Laying Track-Type Vehicles.** F. L. Haushalter, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,402,049. **Detachable Radio-Shielded Spark Plug Lead for Connecting a Manifold Conductor with a Spark Plug.** D. Ingalls, Westfield, assignor to Titeflex, Inc., Newark, both in N. J.

2,402,050. **In a Radio-Shielded Ignition Harness for an Internal Cumbustion Engine, the Combination with a Manifold Having an Outlet, of a Radio-Shielding Conduit of a Spark Plug Lead, a Cable Extending from Manifold into the Conduit, and a Resilient Insulating Body through Which the Cable Passes.** D. Ingalls, Westfield, N. J.

2,402,094. **Milking Machine Cup.** E. Shurts and L. F. Bender, both of Waukesha, Wis.

2,402,105. **In a Multiple Glass Sash, Resiliently Compressible Glazing Means.** C. M. Verhagen, Elkhart, Ind., assignor to Adlake Co., Chicago, Ill.

2,402,114. **Sealing Ring Including a Rubber Body.** C. C. S. LeClair, Acton, London, England.

2,402,201. **In a Gatherer for Nuts, Etc., Gathering and Elevating Elements Including Endless Belts of Compressible Material.** R. E. Martin, San Jose, Calif.

2,402,223. **Rotary Well Bore Cleaner Including a Body of Rubber for Attachment to an Elongate Operating Member.** K. A. Wright, Los Angeles, assignor to B and W, Inc., Long Beach, both in Calif.

2,402,227. **Molded Plastic Shoe.** O. E. Ihle, North Hollywood, Calif.

2,402,231. **In a Wrapper Sealing Mechanism Including a Hollow Mandrel, a Reciprocal Member Movable into the Interior of the Mandrel and Provided with a Semi-Cylindrical Groove in Which Is Embedded a Round Rubber Strip.** C. Arelt, Richmond Hill, N. Y. assignor to American Machine & Foundry Co., a corporation of N. J.

2,402,268. **Resilient Sealing Ring for the Body of a Slush Pump Piston.** H. B. Young, assignor to Mission Mfg. Co., both of Houston, Tex.

2,402,278. **In a Laundry Machine, a Paddle with Resilient Guards.** W. Ganeles, Brooklyn, N. Y.

2,402,287. **Plastic Rivet.** H. Kearns, Pasadena, Calif., assignor, by mesne assignments, to Shellmar Products Corp., Mount Vernon, O.

2,402,323. **Garment with Abdominal-Supporting Means Partly of Elastic Material.** J. N. Gagon, Chicopee Falls, Mass., assignor to Standard Corset Co., Holyoke, Mass.

2,402,356. **Draft Apron for Textile Machinery Including an Outer Layer of Rubber-Like Material, an Inner Layer of Rubber-Like Material Reinforced with Finely Divided Textile Fibers, and an Intermediate Layer of Rubber-Like Material Reinforced with Cord.** H. M. Bacon and A. L. Freedlander, assignors to Dayton Rubber Mfg. Co., all of Dayton, O.

2,402,406. **Valve Including a Cylindrical Sealing Member of Slightly Yieldable and Deformable Material.** W. C. Jaegle, Plainview, N. Y., assignor to H. Strahman, Sr., Livingston, N. J.

2,402,503-504. **Radio-Shielded Lead with Terminal Gasket-Forming Insulator.** G. L. McCutchan, assignor to Rome Cable Corp., both of Rome, N. Y.

2,402,528. **In a Method of Making Patterns for Molding Plaster and the Like, the Use of a Flexible Resilient Thermoplastic Formed in a Negative Mold.** M. Bean, Yellow Springs, O.

2,402,534. **Resilient Rubber Heel.** R. W. Crum, Arlington, Va.

2,402,706. **Blanket for Graphic Reproduction Purposes.** E. A. Sprigg, Wadsworth, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,402,717. **Plastic Framed Laminated Mirror Panel.** E. Winer, Baltimore, assignor to National Plastic Products Co., Odenton, both in Md.

2,402,741. **Spray Head Including a Nozzle Member of Elastic Material.** A. O. Draviner, Glendale, Calif.

2,402,780. **Interchangeable Surgical Neck Dressing Including a Bib-Like Waterproof Flexible Sheet Member, and Fastening Elements Supported by Elastic Straps.** J. Schaffer, Mount Vernon, N. Y.

2,402,836. **In Apparatus for Forming and Compression-Flanging Sheet Metal and the Like and Including Complementary Male and Female Die Means, a Rubber Platen Means for Stretching the Sheet Metal over the Male Die Means and for Effecting Movement of Male and Female Die Means to Compression-Form a Flange.** F. S. Nielsen, Stow, assignor to Goodyear Aircraft Corp., Akron, both in O.

2,402,984. **Self-Contained Breathing Lung.** J. Browne, Milwaukee, Wis., assignor to Diving Equipment & Supply Co., Inc., a corporation of Wis.

2,403,020. **In a Hydraulic Cylinder, a Fluid-Tight Seal Formed by a Resilient Rubber Ring.** J. B. Parsons, Toledo, O.

2,403,028. **In a Faucet Construction, a Resilient Sealing Element.** T. R. Smith, assignor to Maytag Co., both of Newton, Iowa.

2,403,029. **In a High-Pressure Valve and Flat Seat Construction, a Resilient Sealing Element.** T. R. Smith, assignor to Maytag Co., both of Newton, Iowa.

2,403,039. **Fountain Pen.** M. S. Baker, Evansville, assignor to Parker Pen Co., Janesville, both in Wis.

2,403,046. **Mask Construction.** A. H. Bulbulian, Rochester, Minn.

2,403,061. **In a Window Construction, Glass Plates Bonded with Organic Plastic, and a Channel Member of Rubber Compound Surrounding the Perimeter of the Laminated Unit.** D. T. Downes, Creighton, assignor to Pittsburgh Plate Glass Co., Allegheny County, both in Pa.

2,403,074. **Hypodermic Injection Device.** B. J. Goldsmith, Neshanic, N. J.

2,403,235. **Adjustable Eraser.** F. C. Peterson, Randolph, Mass.

2,403,298. **Sealing Apparatus for Effecting a Seal between Relatively Movable Elevents, Including a Tubular Sleeve of Resilient Compressible Material** F. E. Payne, assignor to Crane Packing Co., both of Chicago.

2,403,309. **Airplane Wheel Tire.** R. J. Smith, Richmond Heights, Mo.

2,403,317. **Twisted Strand of a Normally Crystalline Vinylidene Polymer in Which the Crystals Are Oriented Helically about the Axis of the Strand.** R. F. Warren, Jr., Stratford, Conn.

2,403,364. **For Pipe Joints, a Gasket of Impervious Resilient Material, and Consisting of a One-Piece Structure Including Two Coaxial Hollow Truncated Cones That Meet and Are United with Each at Their Smaller Ends.** E. A. Hertzell and R. H. Anderson, Dover, assignors to Robinson Clay Product Co., Akron, both in O.

2,403,418. **Earphone Socket for Steel Helmets of the Type Used for Military Equipment.** J. Volkmann, Cambridge, Mass., assignor to the United States of America, as represented by the Secretary of War.

Dominion of Canada

435,345. **Rubber Plug Seal in a Method of Vacuum Sealing a Can.** Continental Can Co., Inc., New York, assignee of J. H. O'Neil, Syracuse, both in N. Y., U.S.A.

435,407. **Rubber Seal for a Ventilating Window in an Automobile Body Door.** H. A. King, Birmingham, Mich., U.S.A.

435,427. **In a Container for Applying Pasty Substances, a Collapsible Tube Formed of Flexible, Resin-Impregnated Fabric.** W. Stannard, Leek, Staffordshire, England.

435,440. **In an Engine Starting Automatic Pinion Shifting Device Including a Driving Connection through Which the Torque Is Transmitted to the Pinion, the Connection Including Driving and Driven Abutments, an Elastic Spacer between the Abutments.** Briggs & Stratton Corp., assignee of M. C. Fitzgerald, both of Milwaukee, Wis., executrix of the estate of J. W. Fitzgerald, deceased, in his lifetime of Milwaukee, Wis., U.S.A.

435,516. **Lead-in Bushing Including a Member of Resilient Insulating Material Having a Passage Extending Longitudinally Therethrough for an Electric Conduit of Greater Diameter Than the Normal Contracted Diameter of the Passage.** Raytheon Mfg. Co., Newton, assignee of R. U. Clark, Belmont, both in Mass., U.S.A.

435,532. **Diffusion Resisting Barrier for Hydrocarbon Liquids Having Aromatic Constituent, Which Includes a Flexible Supporting Layer and a Surface thereon of a Synthetic Linear Polymide.** Wingfoot Corp., assignee of J. A. Merrill, both of Akron, and L. B. Sebrell, Cuyahoga Falls, both in O., U.S.A.

435,582. **In a Conduit Supporting Clip, a Flexible and Form-Retaining Strap of a Plastic Material.** Adel Precision Products Corp., assignee of H. R. Ellinwood, both of Burbank, Calif., U.S.A.

435,611. **As an Artificial Bristle, a Plastic Filament Having a Capillary Channel Open Along the Side of the Bristle.** Extruded Plastics, Inc., Norwalk, assignee of C. E. Slaughter, New Canaan, both in Conn., U.S.A.

435,615. **Torsion Spring Package Transportable between Manufacture and Installation and Including Torsion Springs, Each Having an Inner Shaft and an Outer Sleeve Structure and a Body of Resilient Rubber-Like Material therebetween and Bonded thereto.** B. F. Goodrich Co., New York, N. Y., assignee of A. S. Krotz, Akron, O., both in the U.S.A.

435,675. **Pantie-Type Garment of Stretchable Material Having a Waterproof Panel.** J. G. Frieman, Tiffin, O., U.S.A.

435,678. **Spray Attachment for a Faucet Including a Resilient Casing Equipped with Resilient Means for Gripping the Faucet.** H. R. Klein, Chicago, Ill., U.S.A.

435,703. **An Electrically Insulating Material Composed of an Inorganic Textile Fabric Impregnated with an Insulating Resinous Organo-Silicon Oxide Composition.** Corning Glass Works, assignee of J. F. Hyde, both of Corning, N. Y., U.S.A.

435,745. **Felt-Like Product Including a Mixture of Non-Adhesive Textile Fibers and Unstretched Thermosplastic Fibers Formed of a Copolymer of Vinyl Chloride and Vinyl Acetate.** Sylvania Industrial Corp., Fredericksburg, Va., assignee of C. S. Francis, Jr., West Harwich, Mass., both in the U.S.A.

435,753. **Shoe Part Having a Single Sprayed Temporary Protective Coating of a Vinyl Resin and a Plasticizer therefor Formed in Situ Directly upon it.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P.Q., assignee of J. Brophy, Salem, Mass., U.S.A.

United Kingdom

577,752. **Adhesive Coated Fabrics.** Johnson & Johnson (Great Britain), Ltd.

577,767. **Collapsible Cooking Receptacle.** United States Rubber Co.

577,888. **Electric Cables.** Okonite-Callender Cable Co.

577,956. **Container for Liquid Fuels.** G. A. Griffiths and Imperial Chemical Industries, Ltd.

577,988. **Gas-Resistant Garment.** Sylvania Industrial Corp.

577,993. **Shock-Absorbing Devices for Road Vehicles and Aircraft Wheels.** D. C. Minett.

578,224. **Shock-Absorbing Bearing.** E. Morf.

578,285. **Spark Plug.** Firestone Tire & Rubber Co.

578,298. **Electric Cables.** Commercial Secretaries, Ltd., and H. A. Tunstall.

578,390 and 578,401. **Fountain Pens.** E. Jacob.

PROCESS

United States

2,401,625. **Flat Wall Having the Inherent Characteristic of Automatically Closing a Puncture Made therein.** E. Eger, Grosse Pointe Park, Mich., assignor to United States Rubber Co., New York, N. Y.

2,401,626. **Self-Supporting Flexible Tank or Lining.** E. Eger, Grosse Pointe Park, Mich., assignor to United States Rubber Co., New York, N. Y.

2,401,642. **Manufacturing Bubble-Free Shapes of Substantial Cross-Sectional Dimensions from Extrudable Synthetic Organic Thermoplastic Material.** J. R. Hiltner, Morrisville, and W. Berlinghof, Jr., Bristol, assignors to Rohm & Haas Co., Philadelphia, all in Pa.

2,401,773. **Casing of a Film-Forming Organic Plastic Material for Stuffed Products.** F. H. Reichel and A. E. Craver, assignors to Sylvania Industrial Corp., all of Fredericksburg, Va.

2,401,774. **Treating Plastic Tubing.** F. H. Reichel, assignor to Sylvania Industrial Corp., both of Fredericksburg, Va.

2,401,798. **Forming and Pretesting a Casing for a Stuffed Encased Product.** F. H. Reichel, assignor to Sylvania Industrial Corp., both of Fredericksburg, Va.

2,402,221. **Prevention of Crazing of a Flash-Heated Shape of Polystyrene.** F. E. Wiley, assignor to Plax Corp., both of Hartford, Conn.

2,402,430. **Inflatable Tire with an Abrasion-Resistant Anti-Skid Tread.** M. Mooney, Lake Hiawatha, and E. M. Grabbe, Nutley, both in N. J., and G. G. Havens, San Diego, Calif., assignors to United States Rubber Co., New York, N. Y.

2,402,631. **Forming Heat-Sealed Articles.** J. S. Hull, assignor to American Pad & Textile Co., both of Greenfield, O.

2,402,967. **Removing Flash from Soft Molded Articles.** L. W. Lubenow, Orange, N. J.

2,403,265. **Cellular Systems.** B. J. Graig, Los Angeles County, Calif.

Dominion of Canada

435,346. **Preparing a Mold of Molten Vinyl Chloride from a Plaster Model.** Dentists' Supply Co. of New York, New York, N. Y., assignee of P. W. Lee, York, Pa., U.S.A.

435,380. **Improved Method of Injection Molding Thermal Setting or Thermoplastic Materials of Relatively Transparent or Transparent Character over or around Bases or Cores.** Standard Products Co., Detroit, Mich., assignee of L. T. Barnette, Wilmington, Del., U.S.A.

435,535. **Fibrous Plastic Articles.** J. B. Hawley, Babson Park, Fla., assignee of S. H. A. Young, St. Charles, Ill., both in the U.S.A.

435,627. **Manufacturing an Electric Insulating Material from Two Different Materials, One a Solid Polystyrene, and the Other a Solution of 1,1' Di-p-Tolylethane in Polystrene.** International Standard Electric Corp., New York, N. Y., U.S.A., assignee of T. R. Scott and A. A. New, both of London, England.

435,721. **Latex Threads.** International Latex Processes, Ltd., London, England, assignee of A. R. Brosi, Providence, R. I., U.S.A.

United Kingdom

577,676. **Reinforced Plastic Materials.** Bristol Aeroplane Co., Ltd., and H. C. Martin.

577,702. **Bonding Rubber to Metal.** United States Rubber Co.

577,708. **Cooling Articles of Synthetic Rubber and Like Molded Material.** G. R. Bates and Bradshaw's Motor House, Ltd.

577,772. **Electric Cables.** C. J. Beaver, E. L. Davey, and W. T. Glover & Co., Ltd.

577,872. **Synthetic Articles.** Firestone Tire & Rubber Co., Ltd., and M. M. Heywood.

577,918. **Impregnated Fibrous Material.** E. P. Newton (Vellumoid Co.).

577,985. **Rubberized Fabric for Tires, Belting, Etc.** Dunlop Rubber Co., Ltd., and J. W. Illingworth.

577,997. **Tubes from Thermoplastic Materials.** R. L. Stephens, W. O. Steel, and Imperial Chemical Industries, Ltd.

578,197. **Impregnating Fabrics and Felts.** Sylvania Industrial Corp.

CHEMICAL

United States

2,401,346. **Polymerizing in Aqueous Emulsion a Butadiene-1,3 Hydrocarbon in the Presence of a Mixture of Xanthogen Compound with an Aliphatic Mercaptan.** C. F. Fryling, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,401,348. **Molding Composition Including the Finely Subdivided Ion Exchange Compound of a Base Exchange Finely Divided Solid and an Ionizable Salt of a Polymerizable Olefinic Carboxylic Acid.** E. A. Hauser and E. M. Dannenberg, both of Cambridge, Mass., assignors to Research Corp., New York, N. Y.

2,401,414. **Improved Process for Converting Conjugated Dienes Containing Less Than 7 Carbon Atoms to Their Dimers.** T. F. Doumani and R. Deery, Long Beach, changed by court order to R. F. Deering, assignors to Union Oil Co. of California, Los Angeles, both of Calif.

2,401,429. **Obtaining Greatly Increased Yields of 2-Cyanoethylamine by Pyrolizing the Reaction Product of Ammonia and Acrylonitrile.** F. E. Kung, Akron, O.

2,401,445. **Polymerizing Vinyl Acetate by Heating under Agitation a Mixture of Vinyl Acetate Monomer, Water as a Vehicle, a Peroxide Polymerization Catalyst, a Water-Soluble Alkaline Substance, and, as a Dispersing Agent, a Starch.** J. O. White, Arlington, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,401,519. **Vulcanization Accelerator Consisting Essentially of Tetraethyl Thiuram Disulfide and about 0.1-0.9% by Weight on the Tetraethyl-Thiuram Disulfide of Tetraethyl Thiuram Monosulfide.** A. A. Somerville, Carmel, assignor to R. T. Vanderbilt Co., Inc., New York, both in N. Y.

2,401,549. **Unsaturated Carbamate and Polymers thereof.** A. G. Chenicek, Elmhurst, N. Y., assignor to Pittsburgh Plate Glass Co., Pittsburgh, Pa.

2,401,581. **Unsaturated Esters and Polymers thereof.** I. E. Muskat, Glenside, Pa., and F. Strain, Norton Center, O., assignors to Pittsburgh Plate Glass Co., Pittsburgh, Pa.

2,401,607. **A Beta-Cyanoethyl Ether of the Formula**

$$R_1(OC_2H_4CN)_m$$

Where R, is an Aliphatic Hydrocarbon Group, and *m* Is an Integer from Three to Six. H. A. Bruson, assignor to Resinous Products & Chemical Co., Philadelphia, both of Pa.

2,401,658. **Compound of the General Formula**

P. T. Paul, Naugatuck, Conn., assignor to United States Rubber Co., New York, N. Y.

2,401,749. **Production of Pentaerythritol and Polypentaerythritols by the Condensation of Formaldehyde and Acetaldehyde in the Presence of Sodium Hydroxide.** R. F. Burghardt, Forest Hills, N. Y., and R. H. Barth, Ridgewood, N. J., assignors, by mesne assignments, to Heyden Chemical Corp., New York, N. Y.

2,401,754. **Finishing High Molecular Weight Polymers Prepared from an Isoolefin at Temperatures below -40° C. in the Presence of a Friedel-Crafts Type Catalyst.** A. D. Green, Cranford, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,401,758. **Removing Acetylene from a Hydrocarbon Mixture Including Substantial Amounts of Diolefin and Acetylene.** S. H. Hastings and B. B. Turner, both of Baytown, Tex., assignors to Standard Oil Development Co., a corporation of Del.

2,401,760. **For Casting Fluid Material, Molds Composed Chiefly of Carbon and a Furfural Compound-Acid Mixture.** A. H. Heyroth, assignor to Carborundum Co., both of Niagara Falls, N. Y.

2,401,776. **Resinous Product Which Is the Reaction of Product of an Acyclic Polyhydric Aliphatic Alcohol and an Aldehyde Heated in the Presence of an Acid Catalyst and a Polymerization Inhibiter.** H. S. Rothrock, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,401,820. **Converting Monoolefins to Diolefins.** H. S. Taylor and J. Turkevich, both of Princeton, assignors to M. W. Kellogg Co., Jersey City, both in N. J.

2,401,846. **In the Preparation of Diolefins by Catalytic Dehydrogenation of Olefins with a Steam Resistant Catalyst in the Presence of Steam, the Step of Activating the Catalyst Prior to the Dehydrogenation Stage by Passing a Mixture of Steam and a Normally Gaseous Paraffin Hydrocarbon in Contact with the Catalyst.** S. D. Sumerford, Baton Rouge, La., assignor to Standard Oil Development Co., a corporation of Del.

2,401,850. **Obtaining a Fluorohydrocarbon by Passing, under Substantially Anhydrous Conditions, a Mixture of Hydrogen Fluoride and a Hydrocarbon from the Group of Acetylene and Monovinylacetylene over a Catalyst Including Mercuric Chromite Intimately Associated with a Chromite of a Metal Which Forms a Hydrogenating Oxide.** G. M. Whitman, Claymont, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,401,872. **Converting Ethane to Butadiene.** J. P. Jones, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,401,885. **Polymerizing in Aqueous Emulsion a Mixture of Butadiene-3,2 and a N-Dialkyl Substituted Amide of Acrylic Acid in Which Each Alkyl Group Contains Less Than 6 Carbon Atoms.** W. L. Semon, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,401,898. **Oxidizable Binder Including a Resin from the Group of the Coumarone and Indene Resins Dissolved in a Resin Modified Drying Oil.** I. M. Bernstein, assignor, by mesne assignments, to H. D. Roosen Co., Inc., both of Brooklyn, N. Y.

2,401,904. **Composition Including an Organo-Soluble Organic Plastic Dissolved in a Mixture of Methyl Isobutyl Ketone and Diisobutyl Ketone.** R. F. Buller, West Los Angeles, assignor to Shell Development Co., San Francisco, both in Calif.

2,401,959. **Polymerizing Methallyl Alcohol.** H. F. Pfann and E. L. Kropa, Old Greenwich, Conn., assignors to American Cyanamid Co., New York, N. Y.

2,401,973. **Method for Obtaining C_4 and C_5 Dienes by Passing Butylene and Pentylene over a Dehydrogenation Catalyst Predominantly Composed of Magnesium Oxide and Iron Oxide.** W. D. Seyfried and S. H. Hastings, both of Baytown, Tex., assignors to Standard Oil Development Co., a corporation of Del.

2,402,020. **Copolymerization of 2-Vinylpyridine and Butadiene-1,3 in an Aqueuos Solution of Sodium Oleate in the Presence of a Peroxide Polymerization Catalyst.** F. E. Cislak and W. H. Rieger, assignors to Reilly Tar & Chemical Corp., all of Indianapolis, Ind.

2,402,021. **Improving the Adhesion of Nylon to Rubber by Dipping Nylon into a Solution of a Synthetic Linear Polyamide and into Another Liquid Material and then Drying the Nylon before Incorporation in the Rubber Material.** J. Compton, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,402,061. **Condensation Product of Dicyandiamide and a Lower Aliphatic Ketone from the Group of Acetone and Methyl Ethyl Ketone.** A. F. MacLean, Stamford, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,402,066. **Preparing 2-Mercapto 4-Alkyl 5-Arylcarbamyl Thiazoles by Reacting Ammonium Dithiocarbamate with an Arylamide of a Beta-Ketonic Acid Having a Hydrogen Atom and a Halogen Atom Attached to the Alpha Carbon Atom.** R. A. Mathes, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,402,113. **Monomeric Butadiene Stabilized with 0.01 to 0.03% by Weight of 4-Tertiary-**

Butyl Catechol. L. F. Hatch, Austin, Tex., and D. E. Adelson and B. O. Blackburn, both of Berkeley, assignors to Shell Development Co., San Francisco, both in Calif.

2,402,123. **Thermoplastic Adhesive Composition Suitable for Forming Vaporproof Laminates, Consisting of Petrolatum, a Compatible Terpene Hydrocarbon Condensation Resin, and an Aluminum Soap.** L. M. Burgess and G. Abson, assignors to H. P. Smith Paper Co., all of Chicago, Ill.

2,402,136. **Producing Polymers of Ethylene and an N-Vinyl Derivative of a Secondary Amide.** W. E. Hanford, Wilmington, and J. R. Roland, McDaniel Heights, assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,402,137. **A Saturated Aliphatic Hydrocarbon Radical Substituted Organic Acid Ester Obtained by Heating under Ethylene Pressure above 200 Atmospheres an Organic Acid Free of Olefinic Unsaturation and a Peroxy Catalyst.** W. E. Hanford, Easton, Pa., and J. R. Roland, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,402,166. **Treating a Surface of a Sheet of Polyvinyl Alcohol Derivative with a Hydrolizing Agent to Convert to Polyvinyl Alcohol a Layer on the Surface without Alteration of the Central Portion of the Sheet, Orienting the Molecules in the Layer, and Treating It with Dichroic Material to Render It Light-Polarizing.** E. H. Land, Cambridge, Mass., a corporation of Del.

2,402,189. **Chlorinated Natural or Synthetic Rubbers Mixed with a Pitch-Free Aromatic Hydrocarbon Oil Boiling above 210° C. and Separated from Other Constituents Including the Heavy Black Pitch Constituents of Tar Obtained in the Vapor Phase Pyrolysis of Petroleum Oil in the Production of Combustible Gas.** F. J. Soday, Swarthmore, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,402,243. **Manufacturing Styrene by Reacting Benzene with Acetylene in the Presence of a Composite of a Friedel-Crafts Metal Halide Catalyst and a Relatively Inert Granular Porous Support.** G. Egloff, assignor to Universal Oil Products Co., both of Chicago, Ill.

2,402,277. **Production of Isoprene from Trimethydene.** F. E. Frey, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,402,456. **Obtaining Organic Sulfides by Heating Sulfur and a Normally Gaseous Monoolefin in the Presence of an Inert Liquid Vehicle under Pressure.** F. K. Signaigo, Brandywine Hundred, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,402,481-486. **Catalytic Polymerization of Unsaturated Esters.** D. E. Adelson, Berkeley, Calif., R. P. Ruh, Columbus, O., and H. F. Gray, Jr., Berkeley, assignors to Shell Development Co., San Francisco, both in Calif.

2,402,506. **Composition with Rubber-Like Properties Formed by Heating in the Presence of a Friedel-Crafts Catalyst a Chlorinated Petroleum Wax and an Oxy-Aromatic Material from the Group of Phenol, the Naphthals, and Diphenyl Ether.** O. M. Reiff and J. J. Giammaria, both of Woodbury, N. J., assignors to Socony-Vacuum Oil Co., Inc., New York, N. Y.

2,402,532. **Impregnating a Batting of Free-Fall Filaments of Cellulose Acetate with a Solution Consisting of Polyvinyl Butyral Containing Polyvinyl Alcohol, Butyl Acetate, and Xylene.** C. M. Clevenger and L. B. Steele, Jr., both of Waynesboro, Va., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,402,566. **Producing Polyhydroxy Derivatives of Such Unsaturated Organic Compounds as Contain an Olefinic Group and the Group**

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N. A. Milas, Belmont, Mass., assignor to Research Corp., New York, N. Y.

2,402,589. **New Halovinylboron Compounds.** H. R. Arnold, Brandywine Hundred, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,402,590. **New Organoboron Compounds from the Group of Chlorovinylboronic Acid and Its Anhydride, Chlorovinylboron Oxide.** H. R. Arnold, Brandywine Hundred, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,402,591. **An Ester of Chlorovinylboronic Acid.** W. A. Lazier, Birmingham, Ala., and P. L. Salzberg, Brandywine Hundred, assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,402,604. **A Polymeric Hydroxamic Acid Which Is the Reaction Product of Hydroxylamine with the Interpolymerization Product of Maleic Anhydride with a Compound Having an Ethylenic Double Bond Attached to a Terminal Methylene Group.** D. D. Coffman, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,402,605. **For Packaging Cheese and the Like, a Wrapping Material Including a Film of Regenerated Cellulose Having a Lacquer Film thereon Composed Chiefly of Nitrocellulose, Polyvinyl Butyral Resin and a Plasticizer, and a Wax Coating on the Lacquer Film.** T. Cowen, Malverne, N. Y., assignor, by mesne assignments, to Standard Cap & Seal Corp., a corporation of Va.

2,402,639. **The Lactone of 4-Mercaptopimelic Acid.** W. A. Lazier, New Castle County, and F. K. Signaigo, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, both in Del.

2,402,640. **Hydroxy-Aliphatic Thiols.** W. A. Lazier, New Castle County, and F. K. Signaigo, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, both in Del.

2,402,641. **Aryl Thiol.** W. A. Lazier, New Castle County, and F. K. Signaigo, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, both in Del.

2,402,642. **Thiols.** W. A. Lazier and F. K. Signaigo, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,402,643. **Thiols.** W. A. Lazier, F. K. Signaigo, and J. H. Werntz, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,402,644. **Mercapto Carboxylic Compounds.** W. A. Lazier, F. K. Signaigo, and J. H. Werntz, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,402,645. **Thionaphthols.** W. A. Lazier, New Castle County, F. K. Signaigo, Wilmington, and L. G. Wise, New Castle County, assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,402,694. **Thiols.** H. G. Tanner, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,402,698. **Thiols.** J. H. Werntz, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,402,740. **Styrenes.** T. F. Doumani, Wilmington, and R. Deery, Long Beach; R. Deery changed by court order to R. F. Deering, assignors to Union Oil Co. of California, Los Angeles, all in Calif.

2,402,806. **Inhibiting Polymerization of Vinyl Compounds by Incorporating a Proportion of a Member of a Group Consisting of N-Nitroso Amines and p-Nitroso Diaryl Amines.** J. R. Durland, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,402,819. **Polymerizing a Butadiene Compound of the Group of Butadiene and Beta Haloprenes in the Presence of an Ester of an Aliphatic Unsaturated Carboxylic Acid and a Monohydric Unsaturated Chlorinated Alcohol.** F. W. Johnson, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,402,837. **Vulcanizable Composition Including Polymerized Chloro-2-Butadiene-1,3, Having Intimately Incorporated therein Zinc Oxide and Magnesium Oxide and a Metallic Salt of an Organic Mono-Carboxylic Acid.** J. P. Nowlen, Wilmington, Del., and M. F. Torrence, Woodstown, N. J., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,402,846. **Forming Latex Threads, Including Discharging a Relatively Thin Continuous Liquid Stream of Liquid Latex into the Center of a Stream of Glycerine to Coagulate the Latex.** A. O. Ryan, River Edge, N. J.

2,402,872. **Non-Crystalline, Light Yellow, Resinous Material Composed of Trichlor Alpha Nitronaphthalene.** F. M. Clark, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,402,873. **Reacting Butadiene with Hydrogen Cyanide by Bringing It in Contact in the Presence of a Friedel-Crafts-Type Catalyst.** D. D. Coffman and L. F. Salisbury, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,402,891. **Preparation of a Diolefin Sulfone by Reacting a Conjugated Diolefin with Sulfur Dioxide in Liquid Phase.** G. W. Hooker, L. R. Drake, and S. C. Stowe, assignors to Dow Chemical Co., all of Midland, Mich.

2,402,909. **Rubbery Copolymer of Butadiene-1,3 and Styrene Containing a Blown Oil Capable of Producing a Factice on Vulcanization with Sulphur.** I. J. Novak, Trumbull, Conn., assignor to Raybestos-Manhattan, Inc., Passaic, N. J.

2,402,910. **Heat Stabilized Polyvinyl Acetal Resin Composition.** I. J. Novak, Trumbull, Conn., and J. N. Kuzmick, assignors to Raybestos-Manhattan, Inc., both of Passaic, N. J.

2,402,911. **Heat Stable and Cold Resistant Rubber-Like Plastic Composition Including a Polyvinyl Acetal Resin Combined and Plasticized with a Compatible Fluid Blown Factice Producing Glyceride Oil Having Appreciable Ethyl Alcohol Solubility.** I. J. Novak, Trumbull, Conn., and J. N. Kuzmick, assignors to Raybestos-Manhattan, Inc., both of Passaic, N. J.

2,402,942. **Shaped Articles from a Solution of a Carboxylic Acid Ester of Cellulose and an Alkylated Glycol Ester of Methacrylic Acid Capable of Polymerization in a Volatile Solvent in the Absence of Plasticizer.** J. E. Bludworth, Cumberland, Md., assignor to Celanese Corp. of America, a corporation of Del.

2,402,975. **Activating Composition for Polyvinyl Butyral Cement Including Polyvinyl Butyral and a Liquid Vehicle.** F. V. Nugent, Abington, assignor to B. B. Chemical Co., Boston, both in Mass.

2,402,977. **Reacting a Mixture of an Alkaline Polysulfide and an Alkaline Hydrosulfide with an Organic Compound Containing at Least One Carbon Atom and at Least Two Carbon-Attached Negative Substituents Split off by the Reaction.** J. C. Patrick, Morrisville, Pa., and H. R. Ferguson, assignors to Thiokol Corp., both of Trenton, N. J.

2,403,004. **Preparing a Resin by Deesterfication of a Copolymer of a Mono Vinyl Ester of a Monocarboxylic Acid and an Ester of Acrylic Acid and a Monohydric Alcohol with a Monohydric Primary Alcohol Liquid in the Presence of an Acid Deesterification Catalyst and Water.** W. O. Kenyon, T. F. Murray, Jr., and L. M. Minsk, assignor to Eastman Kodak Co., all of Rochester, N. Y.

2,403,054. **Separating the Isomers of Piperylene.** D. Craig, Silver Lake Village, O., assignor, by mesne assignment, to B. F. Goodrich Co., Akron, O.

2,403,077. **Providing Metal Surfaces with a Protective Layer of Polyvinyl Compound.** A. Hershberger, Kenmore, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,403,112. **Molded Composition of a Dialkenyl Ester of a Dicarboxylic Acid, Wherein the Alkenyl Radicals Have an Olefinic Linkage Attached to the Second Carbon Atom from the Oxygen Atom Adjacent the Alkenyl Radical.** I. E. Huskat, Akron, O., assignor to Pittsburgh Plate Glass Co., Pittsburgh, Pa.

2,403,113. **1,2-Propylene Glycol Bis (Allyl Carbonate).** I. E. Muskat, Akron, and F. Strain, Norton Center, both in O., assignors to Pittsburgh Plate Glass Co., Pittsburgh, Pa.

2,403,166. **Plastic Packing Consisting of Minute Discrete Particles of Chloroprene Polymer Suspended in a Gel Binder Which Does not Lower the Tensile Strength of the Particles.** H. E. Ballard, Berkeley, Calif.

2,403,167. **Sealing and Lubricating Composition Including Finely Divided Particles of Synthetic Rubber Distributed in Discrete and Undissolved Form in a Mixture of Petrolatum and Aluminum Stearate.** H. E. Ballard, Berkeley, Calif.

2,403,172. **Moldable Masses from a High-Chloride-Content Vinyl-Ester Polymer Resin of Interpolymerized Vinyl Acetate and Vinyl Chloride Treated with Monomeric Methyl Methacrylate until the Vinyl Ester Polymer Resin Is Uniformly Swollen, but not Dissolved.** W. S. Crowell, Melrose Park, and G. W. Birch, Upper Darby, assignors to S. S. White Dental Mfg. Co., Philadelphia, all in Pa.

2,403,179. **Chlorination of a Propylene Polymer Dissolved in a Melted Paraffin Wax.** C. M. Hull and E. L. d'Ouville, assignors to Standard Oil Co., all of Chicago, Ill.

2,430,200. **For the Innermost Layer of a Fuel Tank Lining, the Polymerization Product of Butadiene with an Unsaturated Reactive Compound from the Group of Acrylonitrile and Styrene; the Synthetic Rubber Has Its Surface only Halogenated to a Degree Sufficient to Modify Substantially the Normal Characteristics thereof.** F. T. Weiss, Normandy, Mo., and W. A. Sullivan, Edwardsville, Ill., assignors to Shell Development Co., San Francisco, Calif.

2,403,207. **Salts of Polyfluoro Organic Acids from Polyfluoroethylene Reacted with an Inorganic Sulfurous Acid Salt.** P. L. Barrick, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,403,213. **Molding Composition Including (1) a Performed Partial Copolymerization Product of a Mixture of Diallyl Maleate and a Compound of the Structure $CH_2=CRZ$, Where R Is from the Group of Hydrogen and a Methyl Radical, and Z Is from the Group of an Aryl Radical and a Substituted Aryl Radical; (2) a Liquid Copolymerizable Monomer, and (3) Abrasive Particles.** G. F. D'Alelio, assignor to Pro-phy-lac-tic Brush Co., both of Northampton, Mass.

2,403,215. **Resinous Composition from a Mixture of Vinyl Chloride Polymerized with a Fumaric Ester, in the Presence of a Plasticizer and an Inorganic Basic Compound.** H. Foster, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,403,276. **Dehydrogenating Butylenes to Produce Butadiene.** A. D. Green, Cranford, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,403,313. **Treating a Cemented Outsole with a Mixture of Water Vapor and Solvent Vapor to Activate the Waterproof Cement.** T. T. Taylor, assignor to Compo Shoe Machinery Corp., both of Boston, Mass.

2,403,344. **Sub-Resinous Esterification Product.** M. De Groote, University City, Mo., assignor to Petrolite Corp., Limited, Wilmington, Del.

Dominion of Canada

435,329. **Composition for Making a Light-Transforming Surface Including Alkali Metal Salt of Rhodamine B Hydrochloride and a Reaction Product of Hydrolyzed Polymerized Vinyl Ester with an Aldehyde.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. R. Fonda, Schenectady, N. Y., U.S.A.

435,389. **Composition for Bonding together Surfaces of Material Composed Substantially of Cellulose, Including a Solution of Polyvinyl Alcohol, an Aldehyde and an Acetalization Catalyst.** C. G. Bonard, London, administrator of the estate of H. Dreyfus, deceased, in his lifetime of London, assignee to R. P. Roberts and K. Jones, both of Spondon, both in England.

435,450. **Polyamides.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. W. Hill, Wilmington, Del., U.S.A.

435,451. **Polymerizing a Monomeric Compound from a Group Consisting of Lower Alkyl Esters of Acrylic Acid and Methacrylic Acid to Form a Solid Object.** Canadian Industries, Ltd., Montreal, P. Q., assignee of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., assignee of Norton Co., assignee of C. E. Barnes, both of Worcester, Mass., both in the U.S.A.

435,452. **Preparing Polyamides by Heating under Polymerizing Conditions a Diamine Containing Only Two Reacting Groups with a Dicarboxylic Acid Containing Only Two Reacting Groups, at Least One of Which Reactants Contains at Least One Antecedently Formed Carbonamide Link in the Chain Separating Its Terminal Functional Groups.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. E. Hanford, Wilmington, Del., U.S.A.

435,454. **Preparing Vinyl Chloride by Reacting Oxygen with Ethyl Chloride Oxide Catalyst.** Canadian Industries, Ltd., Montreal, P. Q., assignee of O. W. Cass, Niagara Falls, N. Y., U.S.A.

435,457. **Condensation of an Aromatic Aldehyde with a Compound from the Class of Carboxylic Acids Which Contain an Active Methylene Group and Compounds Hydrolyzable to Such Acids.** Canadian Industries, Ltd., Montreal, P. Q., assignee of M. M. Brubaker, Boothwyn, Pa., U.S.A.

435,459. **Synthesizing a Compound from the Group of Vinyl Halide and Hydrocarbon-Substituted Vinyl Halide.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. A. Lazier, Wilmington, Del., U.S.A.

435,462. **Effecting Substitution Halogenation of an Unsaturated Aliphatic Halide Containing from 2 to 4 Carbon Atoms.** Canadian Industries, Ltd., Montreal, P. Q., assignee of O. W. Cass, Niagara Falls, N. Y., U.S.A.

435,463. **Furan.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. M. Whitman, Claymont, Del., U.S.A.

435,531. **Producing an Arylidene Amine by Reacting a Hydroxy Aryl Dithio Acid with an Aryl Amine.** Wingfoot Corp., assignee of A. F. Hardman, both of Akron, O., U.S.A.

435,665. **Production of Shaped Articles Which Includes Treating Artificial Threads, Foils and Similar Articles Having a Basis of a Polyvinyl Compound Containing Ester Groups with a Saponifying Agent Dissolved in a Straight Chain Aliphatic Alcohol Containing at Least 6 Carbon Atoms.** C. G. Bonard, London, England, administrator of the estate of Henry Dreyfus, deceased, in his lifetime of London, England.

435,687. **Making an Olefinic Nitrile, Which Process Includes the Steps of Heating the Corresponding Alkylene Cyanohydrin in the Presence of a Sufficient Amount of a Catalyst Including an Alkali-Forming Metal Having an Alkaline Reaction so as to Cause Dehydration of the Alkylene Cyanohydrin.** American Cyanamid Co., New York, N. Y., assignee of H. S. Davis, Riverside, and E. L. Carpenter, Old Greenwich, both in Conn., both in the U.S.A.

435,716. **Producing the Laevo Isomer of 2,3-Butylene Glycol.** Honorary Advisory Council for Scientific and Industrial Research, assignee of G. A. Ledingham and G. A. Adams, all of Ottawa, Ont.

435,727. **As a New Chemical Compound, Sulfonated Alkylated Rosin Oil.** National Oil Products Co., Harrison, N. J., assignee of D. Price, New York, N. Y., and E. L. May, Chevy Chase, Md., all in the U.S.A.

435,754. **Reacting in an Aqueous Medium Resorcinol, Formaldehyde, and a Sufficient Amount of an Amine from the Group of Water-Soluble Primary and Secondary Aliphatic Amines to Form an Alkaline Aqueous Solution of a Potentially Reactive Resin, and Mixing the Resin While in Such Dissolved State with Alkaline Latex.** United States Rubber Co., New York, N. Y., assignee of E. S. Ebers, Nutley, N. J., both in the U.S.A.

United Kingdom

577,735. **Useful Materials Derived from Ethylene Urea.** Imperial Chemical Industries, Ltd.

577,749. **Polymerization of Linear Formals and Esters thereof.** Imperial Chemical Industries, Ltd. (E. I. du Pont de Nemours & Co., Inc.).

577,753. **Waterproofing Casein Formaldehyde Plastics.** J. B. Speakman, J. L. Stoves, and Erinoid, Ltd.

577,761. **Plasticized Compositions Including Polyvinyl Alcohol.** Imperial Chemical Industries, Ltd.

577,771. **Polymeric Substances.** E. Isaacs, H. Gudgeon, and Imperial Chemical Industries, Ltd.

577,828. **Electric Insulating Materials.** Standard Telephones & Cables, Ltd., T. R. Scott, and A. A. New.

577,829. **Reclaiming Rubber.** F. H. Cotton and P. A. Gibbons.

577,843. **Biguanide Derivatives.** F. H. S. Curd, F. L. Rose, and Imperial Chemical Industries, Ltd.

577,860. **Electrical Insulating Compositions.** Standard Oil Development Co.

577,861. **Polymerization of Vinyl Acetate in Emulsion.** Shawinigan Chemicals, Ltd.

577,867. **Electrical Insulating Compound.** Callender's Cable & Construction Co., Ltd., and G. M. Hamilton.

577,868. **Reclaiming Vulcanized Rubber.** Dunlop Rubber Co., Ltd., D. F. Twiss, A. J. Hughes, and F. A. Jones.

577,871. **Synthetic Rubbers.** Firestone Tire & Rubber Co., Ltd., and M. M. Heywood.

577,874. **Plasticization of Rubber and the Like.** Dunlop Rubber Co., Ltd., D. F. Twiss, and F. A. Jones.

577,875. **Stabilizing a Plastic Composition Including Ethyl Cellulose.** Hercules Powder Co.

577,876. **Chlorinated Hydrocarbons.** W. N. Howell and Imperial Chemical Industries, Ltd.

577,920. **Forming Plastic Solutions and Incorporating Solid Filling Material therein.** C. E. Boutwell.

577,943. **Electric Insulating Materials.** Standard Telephones & Cables, Ltd., and M. C. Field.

577,954. **Coating Compositions.** H. Sohm.

577,983. **Amino Alcohol.** Wingfoot Corp.

578,012. **Vulcanization of Chloroprene - Type Synthetic Rubber-Like Materials.** W. Baird, B. J. Habgood, D. A. Harper, J. A. Hendry, and Imperial Chemical Industries, Ltd.

578,019. **Cyclized Rubbers.** Wingfoot Corp.

578,045. **Raw Tire Stock.** Dunlop Rubber Co., Ltd., W. G. M. Peare, G. H. B. Yoxon.

578,079. **Highly Polymeric Substances.** J. R. Whinfield and J. R. Dickson.

578,083. **Polymerizable Products from Hydrogenated Naphthalene and of Resins Made therefrom.** W. I. Jones, Powell Duffryn, Ltd., and R. Hutt.

578,086. **Butadiene.** G. M. Henderson and Imperial Chemical Industries, Ltd.

578,124. **Organic Compounds Containing Sulfur.** E. I. du Pont de Nemours & Co., Inc., and A. M. Alvarado.

578,168. **Polymerization of Trifluorochloroethylene.** American Viscose Corp.

578,179. **Halogenated Hydrocarbons.** E. I. du Pont de Nemours & Co., Inc., and F. W. Johnson.

578,196. **Resinous Reaction Products of Aldehydes and Triazine Derivatives.** British Thomson-Houston Co., Ltd.

578,209. **Manufacture of Polymers from Acrylonitrile.** R. G. R. Bacon, L. B. Morgan, and Imperial Chemical Industries, Ltd.

578,214. **Rubber-Like Plastic Materials.** E. I. du Pont de Nemours & Co., Inc., and J. L. Parker.

MACHINERY

United States

2,401,551. **Apparatus for Applying Plastic Coatings to Flexible Strips, Etc.** H. A. Cook, Jr., assignor to Auburn Button Works, Inc., both of Auburn, N. Y.

2,401,870. **Tire Retreading Equipment.** P. E. Hawkinson, assignor to Paul E. Hawkinson Co., both of Minneapolis, Minn.

2,401,991. **Apparatus for Jointing Strips of Thermoplastic Insulating Material.** G. H. Walton and J. C. Quayle, both of Helsby, and P. Jones, Kelsall, assignors to British Insulated Cables, Ltd., Prescot, Lancashire, all in England.

2,402,281. **Extrusion Die for Molding Apparatus.** L. B. Green, Lakewood, O.

2,402,310. **Means for Dispensing Latex or the Like.** A. H. Beaumier, North Hollywood, Calif.

2,402,805. **Apparatus for Injecting Plastic under Pressure.** W. P. Cousino, Detroit, assignor to Chrysler Corp., Highland Park, both in Mich.

Dominion of Canada

435,340. **Apparatus for Forming Corrugations in a Sheet of Felted Fibrous Material Impregnated with a Thermoplastic.** Certain-Teed Products Corp., New York, N. Y., assignee of J. A. Soissa, Winnetka, Ill., both in the U.S.A.

435,507. **Apparatus for Spraying Metal, Thermoplastic Material, or Other Non-Metallic Powder.** Metallization, Ltd., Dudley, Stafford, assignee of W. E. Ballard, Birmingham, Warwick, and B. D. H. Blount, Hagley, Worcester, all in England.

United Kingdom

577,719-720. **Apparatus for Heating Insulating Material by Subjecting It to a High-Frequency Field of Electric Force.** British Insulated Cables, Ltd., J. C. Quayle, and P. Jones.

578,337. **Press for Moldable Plastic Material.** Romac Industries, Ltd., and R. D. Boyce.

UNCLASSIFIED

United States

2,401,715. **Vehicle Wheel Alinement Testing Apparatus.** E. D. Wilkerson, Orange, N. J.

2,401,876. **Cable Testing Means.** A. L. Marker and E. W. Bergere, both of San Diego, Calif.

2,401,921. **End Fitting for Flexible Hose.** R. J. Fisher and W. H. J. Brock, assignors to Automotive Products Co., Ltd., all of Leamington Spa, England.

2,401,950. **Filling Tires with Liquid.** W. W. McMahan, assignor to Wingfoot Corp., both of Akron, O.

2,402,022. **Tire Tool.** S. F. Corbell, Clifton, Ariz.

2,402,357. **Machine for Applying Labels to Rubber Hose and the Like.** H. O. Bates, Cranford, N. J.

2,402,616. **Adapter for Connecting a Flexible Hose to Standard Tire Valve Stem.** W. Fenton, Philadelphia, Pa.

2,402,689. **Abrading a Resinous Impregnated Fabric to Remove the Surface Incrustating Materials.** H. Snow and S. D. Pickard, both of Charlotte, N. C., assignors to Southern Friction Materials Co., a corporation of N. C.

2,402,710. **Hose Clamp.** G. A. Tinnerman, assignor to Tinnerman Products, Inc., both of Cleveland, O.

2,402,896. **Insecticide.** T. W. Kerr, Jr., Seymour, Conn., assignor to United States Rubber Co., New York, N. Y.

2,403,312. **Non-Skid Chain.** J. Sweeney, Detroit, Mich.

Dominion of Canada

435,374. **Hose Coupling.** Resistoflex Corp., Belleville, assignee of K. Pape, Dover, and A. N. Treshkin, Montclair, all in N. J., U.S.A.

435,441. **Apparatus for Slitting a Length of Electric Insulating Material.** British Insulated Cables, Ltd., Prescot, Lancashire, assignee of J. C. Quayle and R. Bayles, both of Helsby, Cheshire, and P. Jones, Kelsall, near Chester, all in England.

435,681. **Providing Articles Made from Plastics with Printed Coverings.** L. Rado, London, England.

435,706. **Mechanism for Twisting Strands together to Form a Ply Construction.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. P. Lewis, Fairhaven, Mass., U.S.A.

435,761. **Hose Coupling.** Wheaton Brass Works, Newark, assignee of H. C. Krone, River Edge, and W. Meyer, East Orange, all in N. J., U.S.A.

TRADE MARKS

United States

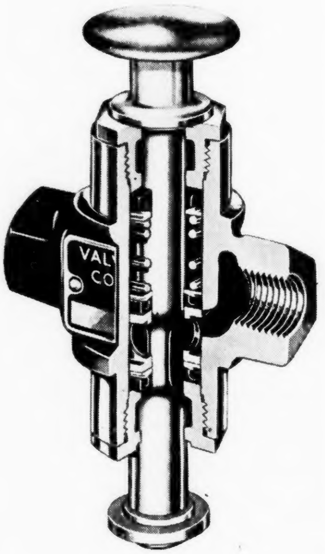
421,209. **Flex-Vac.** Moisture-proof composition bags. Standard Cap & Seal Corp., Chicago, Ill.

421,238. The words: **"Maid Aid,"** separated by a drawing of a leaf, and the representation of a woman thereon. Powder or solution dispenser. Utility Tool & Die Manufacturers, Los Angeles, Calif.

421,243. Representation of a label containing the word: **"Gates."** Gates Rubber Co., Denver, Colo.

(Continued on page 884)

New Machines and Appliances



Cutaway of Valvair Two-Way Knob Valve

New Valves

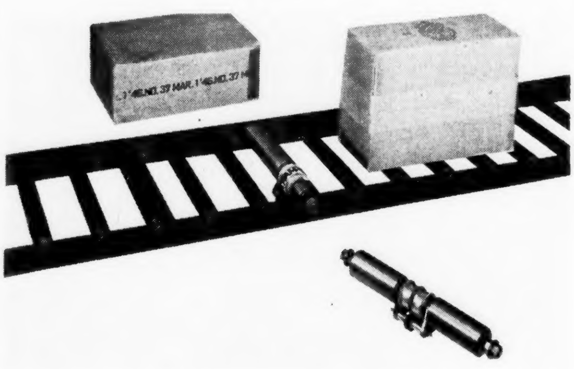
A NEW series of valves has been announced by the Valvair Corp., Akron, O., to answer the need of more efficient and durable air control valves capable of withstanding continuous hard service. The valves are designed to operate on air pressures up to 200 pounds and temperatures up to 120° F. Exhaustive tests were performed on the valves to prove their efficiency and durability prior to placing them on the market.

The basic design is a patented feature and embodies a sliding stem moving through a series of specially designed packers which seal the air in an "on" or "off" position without the use of metallic seats. The area through the valves is equivalent to standard pipe sizes, which eliminates air flow restrictions. The cylindrical ends of the valve body are identical, and each valve size has a diameter proportional to its size and capacity, permitting use of many control combinations on either end of the valves.

Being non-corrosive, the valves have an indefinite material life with unlimited adaptability. The valve bodies and brackets

are made of cast bronze; while bearings and other internal parts are of bar brass and bronze. All steel parts used in construction of the valves are of stainless steel.

The valves are made in nine basic designs: knob, lever, foot, cam, clevis, single diaphragm, double diaphragm, single solenoid, and double solenoid. Special valves or valve combinations are also obtainable upon request. All valves are produced in two-, three- and four-way operated types. Available sizes are $\frac{1}{4}$-, $\frac{3}{8}$-, $\frac{1}{2}$-, $\frac{3}{4}$-, and one inch for all valves except the knob types, which are produced only in the $\frac{1}{4}$-, $\frac{3}{8}$-, and $\frac{1}{2}$-inch sizes.



Rolacoder 50 Automatic Marker

Automatic Marking Attachment

THE Rolacoder 50 is a marking attachment for placing a continuous impression on the bottom of a case or crate as it travels along on a roller conveyer. The assembly, which is self-inking, is installed in a roller conveyer in place of one of the standard rollers. The type cylinder carries a channel or slot into which the interchangeable rubber type is inserted. Inking is performed by two solid felt ink rollers in contact with the type.

The attachment will imprint a code or mark repeating approximately every six inches, permitting one full imprint on cases as short as six inches in length. For cases of length less than six inches, the information may be inserted twice in the die wheel. Type sizes may be $\frac{3}{8}$- or $\frac{5}{8}$-inch, and the inks are quick drying and permanent. The Rolacoder 50 is made with two-inch diameter rolls. For those roller conveyers requiring smaller diameters, the unit is mounted below the center line of the other rollers so that the top surfaces are in line. Should it be desired to mark the top surface of a carton, it is only necessary to deliver it to the conveyer upside down. Adolph Gottscho, Inc.

EUROPE

GREAT BRITAIN

Reclaimers' Association Meets

The National Reclaim & Allied Rubber Trades Association held its first annual general meeting in London on June 7, when the matter of reparation equipment and the shortage of carbon black and china clay were discussed. A study party had gone to Germany to inspect reclaiming and other equipment, it was stated, and had brought back full details of the machinery available. The Allied Control Commission ruled, however, that none of this plant should be removed; but since many small firms in England urgently need some of the equipment available, the Association decided that attempts should be made in the proper quarters to obtain a reversal of the present policy.

It was next agreed to ask the government to take immediate steps to set up plants for the production of carbon black to relieve the serious situation in the rubber industry caused by the shortage of this material.

Interest Growing in the I.R.I.

Following the formation of the first overseas section of the Institution of the Rubber Industry in Australia, evidence is increasing of growing interest in the establishment of sections also in other parts of the British Empire. Recently a request for a section was received from India, and an advisory committee was set up to form a section there at an early date. Facilities for technical education are being investigated by the committee so that examinations may in due course be held for the I.R.I. At present meetings are being held in India, at which timely papers are being read.

It appears that interest also is shown in the movement in South Africa, Canada, and Malaya, among others, so that it is expected that before long these territories too will request their own overseas sections.

Rubber and Plastics Machinery from Germany

Details concerning German rubber and plastics machinery available to British manufacturers have been provided by the Control Commission for Germany and Austria to the Federation of British Rubber & Allied Manufacturers' Associations. These machines may be purchased through the British Government which, it is emphasized, is undertaking their importation purely as a stop-gap. Manufacturers, therefore, will not be permitted to buy any of this machinery if it is possible to acquire British machinery of the same type, with short delay, in the normal way. The German machinery includes, among others, mills and breakers of different dimensions; calenders including a few for plastics, refining mills, extruders, a horizontal bias cutting machine, autoclave presses, hydraulic boiler and platen presses, vulcanizers, complete plant for conveyer belting up to 1,400 millimeters, and hydraulic presses for plastics.

British Rubber Industry Notes

Goodyear sports tires have been used for the first time at recent speedway competitions at Wembley, and motorcycles equipped with the tires won every event, it is reported. The development of these new tires is traced back to prewar days when speedway stars were clamoring for tires with a special tread of their own designing, capable of giving increased traction. J. C. Brown, head of a retreading firm in Camberwell, successfully tested their ideas on old Goodyear carcasses, and Goodyear incorporated the new type of tread in its latest sports tires.

D. F. Twiss, for 32 years chief chemist of Dunlop Rubber Co., Ltd., has announced his intention to retire this year. Dr. Twiss, who joined Dunlop in 1914, has become well known

for his work on vulcanization and the direct use of latex, and he holds more than 200 patents, of which more than 100 relate to latex alone. In 1934 he received the Colwyn Gold Medal for his scientific contributions to the knowledge of rubber. He is vice president of the Institution of the Rubber Industry and represented Dunlop on the London Advisory Committee for Rubber Research (Ceylon and Malaya) from its inception until June, 1946.

Dunlop is investigating the possibilities of more widespread use of rayon for tire cord and is understood to be contemplating the establishment of a new factory for processing rayon tire cord.

A new Dunlop subsidiary, Dunlop Clothing & Weatherproofs Co., Ltd., is to be formed to handle the concern's expanding business in men's suits and clothing made from plastic materials.

The Federation of British Industries will organize a two-day conference on exports to take place in London, November 27-28, when practical problems facing industry in the drive for exports will be defined and discussed. Among the speakers will be Sir Stafford Cripps, president of the Board of Trade.

The Export Group of British Plastics and the Oilskin Manufacturers' Export Group were added to the lists of Export Groups of the United Kingdom during July.

A new type of swimming float is soon to appear on the market. Designed and patented by a physical training instructor at a Glasgow School, the float consists of a double rubber pad connected by a rubber neck. One pad fits around the neck like a collar; while the other pad, linked to the collar, straps over the abdomen. It is claimed that this design has the effect of supporting the body and keeping the head clear of the water, which action is not possible with the older type of water wings. It is understood that the new device will be produced and marketed by Ioco Rubber Co., Ltd.

The Chemical Society, Burlington House, Piccadilly, London, W1, was 100 years old in 1941, but because of the war is only now able to plan for appropriate observation of the event. It has been decided to celebrate the centenary on July 15-17, 1947; immediately after the celebrations the eleventh International Congress of Pure and Applied Chemistry will take place. It is further hoped to arrange a number of scientific lectures, visits to places of interest in the London area, and an exhibition at the Science Museum, South Kensington, during the period of the celebrations and the International Congress.

At the annual meeting of the Institute of Physics the following were elected to take office on October 1, 1946: president, A. M. Tyndall; vice presidents, J. A. Crowther, H. Lowery, and A. J. Philpot; honorary treasurer, E. R. Davies; honorary secretary, B. P. Dudding; new ordinary members of the board, A McCance, W. S. Vernon, F. A. Vick. G. F. C. Searle was elected Honorary Fellow of the Institute.

The newly formed Industrial Spectroscopic Group of the Institute of Physics held its first conference in London on July 5 and 6, when the present status of industrial spectroscopy was reviewed.

Rubber Industry Returning to Prewar Items In Scotland

Rubber manufacturers in Scotland are still faced with a serious labor problem, as a result of the elimination from the industry of much of the prewar female labor, and the difficulty of recruiting afresh, in view of the general scramble for women workers and the reduced volume of such labor as is now available.

Despite this lack of staff, considerable progress has been made toward the resumed production of many prewar lines, although certain types are not yet in production. The exact stage of reconversion varies according to the firm concerned, but a general picture indicates that greatest attention is being devoted to goods in most urgent demand. Thus a great many products, although necessary or desirable, are not essential and are therefore not likely to go into production until essentials are largely satisfied. Consequently a major amount of attention is being given to tires, footwear, and clothing, and less to sports goods, flooring and the many rubber lines sold through hardware and allied shops. Accessories of all sorts are not yet into full production and are even being ignored in some instances until essentials are covered.

In the household goods trade exists a reluctance to manufacture a wide range of varied goods and so dissipate energy over many, instead of one or more main lines. Rubber flooring is not yet into production since machinery has been in

some cases dismantled and must be reestablished. Evidence of the policy adopted generally, is seen here. Although rubber flooring and stair runners are not being produced, some rubber nosing has been made to allow the repair and maintenance of rubber stair runners. Permission has been given to makers to apply for authority to manufacture flooring, but the general opinion is that this may not mature for some time.

Tires of all sorts are being given special attention and come within the scope of essential items. Sports goods now in production include golf and tennis balls, for which allocations of good-quality natural rubber are being issued. This new rubber is welcomed, although it involves the manufacturers in a reevaluation of the nature and performance of this raw material. Supplies and even the same supply may vary considerably in performance as to encourage a cautious approach to manufacturing. Golf balls are being produced increasingly and distributed as fast as they can be made. There has been a consequent slump in the remold trade, which is worrying manufacturers, who contend that there is still ample need of the maintenance of remolding to make good the shortage of balls, as not nearly enough new balls can be produced to meet the current demand.

Most rubber companies have expanded into the plastic field in the war years, and plastic sports trousers are one line being produced in a limited degree to test the market demand. Plastic club covers for golf clubs have also been recently produced, but here again it is problematic whether the present production will be continued when suitable prewar materials are available.

In the footwear field chief attention is being devoted to industrial footwear of all types and to farm, fishing, and similar boots, either of the Wellington or lacing types. Considerable production is also developing in sports shoes and plimsols, and some export trade is developing in these. The problems here include the limited available amounts of textiles and the shortage of female labor.

The industry is essentially concentrating on getting its main lines restarted and in supplying the type of goods for which urgency is pleaded. As the labor and textile positions improve, a continuing expansion of all prewar manufacturing is expected.

Cashew Shell Oil for Resins

The "Bulletin of the Imperial Institute"[1] covers the use of cashew-nut shell oil in the manufacture of synthetic resins. This oil is extracted from the soft, honey-comb structure between the outer shell and the kernel of cashew nuts. Until quite recently cashew shell oil was prepared commercially only in India, but lack of competition in the Far East stimulated the development of a cashew nut industry in Northern Brazil, and a moderate industry in the production of the oil has been started.

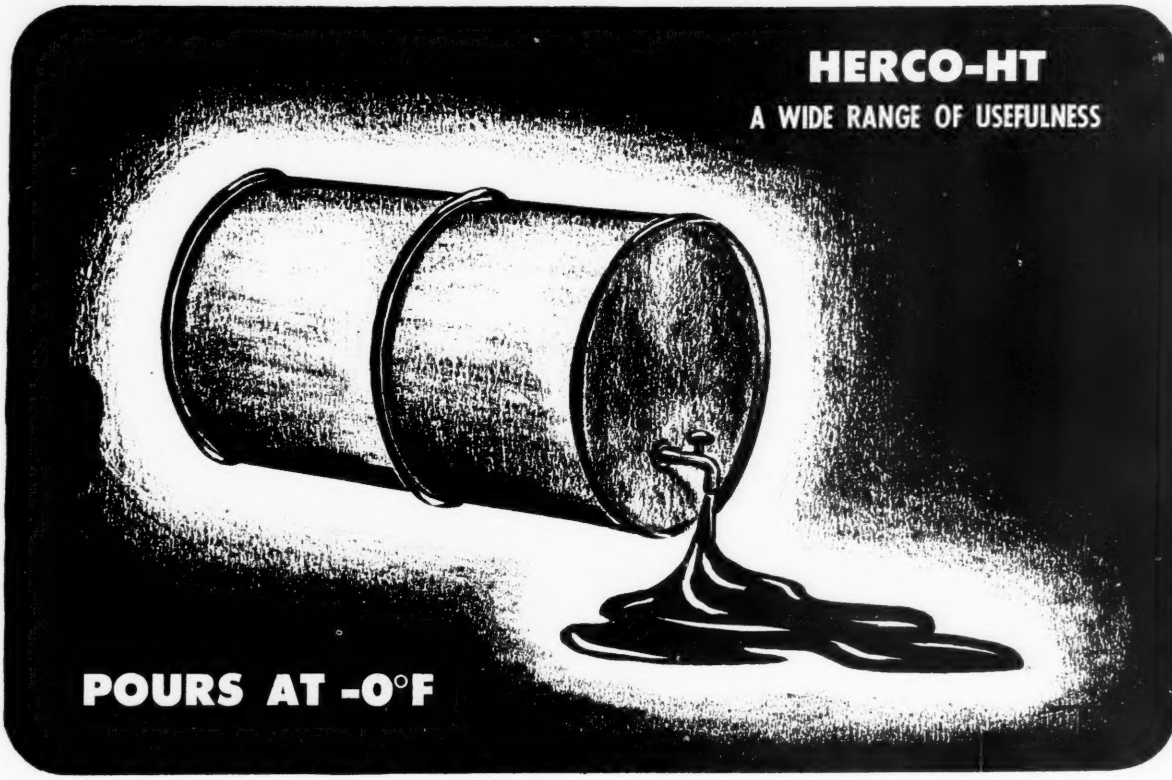
Cashew shell oil is a dark viscous liquid with poisonous properties; the main chemical constituents are a phenolic body, cardol (about 10%), and a second phenolic substance, anacardic acid (about 90%). In India the oil has long been used for waterproofing purposes, for instance for bamboo screens and the like; and for mixing with cement for floorings. In the United States the oil has been used industrially on a small scale for several years, but recently interest in this raw material has increased both in America and in the United Kingdom.

One of the main uses of cashew shell oil is in the manufacture of synthetic resins employed either alone or with other materials in the manufacture of numerous products such as insulating varnishes, typewriter rolls, oil- and acid-proof cold-setting cements, floor tiles, and brake linings. Resins prepared from the oil are said to have good resistance to acids and alkalis.

In the manufacture of resins, the crude cashew shell oil is first treated with an acid to remove metallic impurities and to decompose the traces of sulphur compounds. The resulting product may then serve as base in the preparation of resins or may be subjected to steam distillation, by which it is separated into two fractions. The distillate contains a phenol cardinol, derived from the anacardic acid originally present; the portion non-volatile in steam contains cardol and a polymer formed during the treatment to which the oil has been subjected.*

There are several methods of preparing resins from the treated oil, the volatile and non-volatile products obtained on steam distillation. In some methods the material is first given an acid treatment, with an alkyl sulfate, for instance, to polymerize it, and the polymerizate is then condensed with an

[1] Jan.-Mar., 1946, pp. 17-20.



HERCO-H. T. is an aromatic hydrocarbon softening oil—a true chemical softener for Crude Rubber, GR-S, Buna N, and Neoprene.

CHARACTERISTICS

Specific gravity	1.031
Pounds per gallon	8.59
Color	Dark Green
Boiling point	575° F.

RECOMMENDED ADVANTAGES

1. **Hastens breakdown and compounding.**
2. **Rapidly wets fillers and loading materials.**
3. **Assists calendering.**
4. **High speed extruding.**
5. **Enhances impregnating properties of friction compounds.**
6. **Increases tackiness and resilience.**
7. **Imparts greater elongation with no loss in tensile strength.**
8. **Reduces swelling effect of oils and greases.**
9. **Does not bloom from vulcanizate when used in large amounts.**
10. **Highly compatible with GR-M.**

RUBBER
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Chemicals

For samples and compounding information on softening oil and waxes please write to Herron Bros. & Meyer—Our Technical Representative will be glad to call on you.

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SUPPLIERS OF RUBBER CHEMICALS

aldehyde, yielding a range of resins with varying properties. In other processes, no acid polymerization precedes the condensation with aldehydes, resulting in a different range of resins

The use of products obtained from cashew shell oil, other than by aldehyde condensation, has also been investigated. For instance, a certain higher ether has been widely used as a constituent of cable cloth varnishes; while an acid ether has been employed in the preparation of naphthenic acid driers and in alkyd resin manufacture.

FRANCE

Rubber at the Paris Industrial Trade Fair

The progress that France, despite many difficulties, is making in reconstructing her industries was well demonstrated at the Paris Industrial Trade Fair, held May 25-June 10, 1946. The Fair attracted many visitors not only from the provinces, but from foreign countries, some of which were also represented among the exhibitors.

The rubber exhibits, however, did not have a separate section; comparatively few rubber manufacturers sent displays, and these were shown as accessories in larger sections or as sub-sections. Thus in the extensive machinery section were found various samples of technical goods made by the Société Colombes Goodrich, including hose, belting, joints, and Vulcalock linings for the chemical industry.

Getting-Jonas-Titan presented a wide range of U. S. driving belts made by the United States Rubber Co.

In the same section the Turover concern displayed specimens of its wide range of products including rubber boots, rubber-soled slippers, surgical and hygienic goods, household articles, and sporting goods.

In the apparel section Etablissements Gabriel Wattelez showed soles of compressed rubber waste. Cow & Co., London, England, had on view besides plastic goods, a variety of rubber items including gloves, hot water bottles, camping accessories and an extra-light-weight impervious garment for protection against acids.

The importance of pneumatic tires in modern farming was demonstrated in the Agricultural Section where Société Dunlop, Syndicat des Constructeurs Français de Matériel de Motoculture, and various American, Canadian, and Swiss firms showed tires of all sizes and different tread designs, separate or mounted on tractors, harvesters, reapers, binders, carts, grading devices, threshers, and other farm implements.

If the display of rubber goods was incomplete, this condition was largely due to the fact that because of the shortage of rubber many articles have perforce still to remain on the nonessential list.

Increasing Production of Rubber Products

The output of rubber goods, particularly tires, footwear, and certain mechanical goods, is steadily increasing and in some cases has lately been exceeding prewar rates. But the demand is still far greater than the supply, especially in the articles just named. Latest information states that the monthly output of rubber-soled shoes in France is now about 600,000 pairs. Production of cycle tires, 1,000,000 units in May, was estimated at 1,181,000 in June; but even at the present rate of production there are those who consider that hardly more than two-thirds of present demand for cycle tires will be met this year.

News from the tire manufacturing center, Clermont-Ferrand, indicates that Michelin apparently has overcome most of the difficulties created by the partial destruction of factories by bombs and the shortage of raw material. This concern has been producing a steadily increasing quantity of all kinds of tires; in fact for some types the daily average is already above that of 1939. The daily average production of cycle tires in 1939 was 16,500 units; in 1944 it was 15,500 units; and in 1946, 22,500 units. Daily output of passenger-car tires in 1944 averaged only 230, but in 1946 it reaches 3,200 units; the 1939 daily output of heavy-duty tires was 1,350; in 1944 none at all were produced, but the 1946 average is reported to be 1,550 units.

Another well-known firm in the Clermont-Ferrand area, the Bergougnan concern, also reports progress; daily production of cycle tires has been raised from 3,200 in 1945 to 3,400 in 1946; passenger-car tires, which came to 350 in 1946, now amount to 450. The company states also that daily production of belting for use in mines has risen from 28 tons in 1944 to 84 tons in 1946.

Universal Plastometer Developed

A universal plastometer with which either Williams tests (measuring compression of samples under constant load) or Defo tests (measuring load required to obtain constant compression) can be carried out has been developed by Etablissements Lhomme & Argy. The apparatus consists of an electrically heated, non-conducting oven with adjustable temperature arrangement and is also provided with a manifold system for distributing circulating air.

A hand-operated fly-wheel rotatably advances an interior platform along the border of which are arranged eight supports for test pieces. A movable, vertical arm applies to the sample the pressure appropriate for each of the two testing methods.

The arm is impelled by a jointed lever (the kilogram lever) on which a slide travels. Above this is the gram lever, on which another slide travels. By means of these two slides any desired load from 0 to 21 kilograms can be applied to within ten grams.

To insure accuracy of the load reading, the kilogram lever can be brought back instantly to the horizontal position by moving its axle. A vernier scale indicates its position, that is, the height of the sample for the horizontal position of the lever.

The spindle of the micrometer rests on a platform carried by a rod of light metal sliding in the pressure arm. The platform and its rod are equilibrated by means of a small lever permitting measurements to be made without load. A porthole with window permits observation of the test.

The Williams test is carried out by adjusting the slide for five kilograms; while the Defo test is conducted by determining, by trial, the load required for compression amounting to four millimeters in 30 seconds. All normal manipulations can be performed conveniently by the operator from his seat in front of the apparatus.

"The ABCs of Modern Plastics." Bakelite Corp., New York, N. Y. 36 pages. This booklet, written in a simplified style, provides a brief outline of the origin, preparation, and uses of plastics. Technical processes are explained in terms of everyday living and illustrated by colorful charts and drawings. Subjects discussed include thermosetting and thermoplastic materials; molding and extrusion; laminating; plywood molding and wood bonding; bonding and coating materials; impregnating, sealing, and calendering materials; cast resins; fabricated forms; and the properties of the various plastics.

Editor's Book Table

BOOK REVIEWS

"Theory and Practice of Filtration." George B. Dickey and Charles L. Bryden. Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Cloth, 6 x 9¼ inches. 350 pages. Price, $6.

This volume, one of the Modern Library of Chemical Engineering, is a clear and comprehensive exposition on filtration as applied to the separation of solids from liquids by the use of porous media. Gas filtration is only briefly touched upon, with the bulk of the text confined to the separation of solids from liquids. Aside from a few special cases, no particular application is considered separately, but only as part of the whole to illustrate the functioning of different types of filtration apparatus.

The volume is divided into two distinct parts: first, history, theory, and principles, as a foundation for the proper understanding and interpretation of filtration; and second, the various types of filters and data pertaining thereto. Individual chapter headings are as follows: History of Filtration; Theory and Principles of Filtration; Filtration Objectives; Preparation for Filtration; Filter Media; Gravity Filters; Pressure Filters; Vacuum Filters; Hydraulic Presses and Squeeze Presses; Laboratory Filters; Oil Filters, Oil Expellers and Oil Separators; Water Filtration; Sewage Clarification and Sewage Sludge Dewatering; Centrifugals and Centrifuges; Air, Gas and Light Filters; Auxiliary Equipment; Typical Filter Applications and Flow Sheets; Testing and Section of Equipment; and Installation and Operation. There are two appendices: one on Surface and Interfacial Tension Separation of Immiscible Fluids; and the other on Terms, Tables and Chart. There is also a detailed and comprehensive index of subject matter.

Of special interest are the sections on rubber and Vinyon as filter media, giving methods of manufacture of such media, their design, and advantages and disadvantages of their applications. In the chapter on typical filter applications there is a generalized discussion of the types of filtration employed in the rubber and synthetic rubber industries.

"The First Decade of Batanagar." Jan Baros. Published by the Club for the Graduates of Bata School, Batanagar, 24-Parganos. India. 1945. Hard board, 7½ by 9¾ inches, 200 pages; illustrated.

Soon after Thomas Bata, founder of Bata Shoe Co., Zlin, Czechoslovakia, and numerous subsidiaries all over the world, first visited India early in 1925 with the primary object of obtaining raw materials, the first Bata shoes made in the Zlin factory began to appear in Indian stores. By 1928 the first of the many Bata shoe shops in India was opened in Calcutta, and after a few more years the first Bata factory in India was started in Konnagar where rubber-soled canvas shoes were produced. Soon existing facilities proved inadequate, and a site was acquired in Bengal, not far from Calcutta, where in 1934 the foundation stone was laid of Batanagar—or Bata town—which, it was hoped, would become "a town of activity, a town of healthy and happy people who by their work would create values for themselves, their district and the whole country," to quote the words of the manager of the Bata Shoe Co. Ltd., in India, J. F. Bartos.

How the company went about attaining this end, how Batanagar contributed to the war effort in men, goods, and money, are all told in detail in this profusely illustrated book, which also reveals how Thomas Bata started to manufacture footwear in the first place.

"The Chemistry of the Carbon Compounds. Volume III. The Aromatic Compounds." By Victor von Richter. Edited by the late Richard Anschütz. Elsevier Publishing Co., Inc., 215 Fourth Ave., New York, N. Y. Cloth 5½ by 8½ inches. 810 pages. Price $15.

This is the third volume of the third English edition of the twelfth German edition of the standard reference work. Volume I, published in 1934, is titled "The Aliphatic Series;" Volume II, published in 1939, "The Alicyclic Series and Natural Products," and Volume IV, to be published in 1946, "The Heterocyclic Series and Organic Free Radicals." Revision of this English edition was interrupted by the war and after ap-

proximately page 50 of the text, this volume consists of a literal translation of Volume II, part 2, of the German text without revisions or additions to the literature, except that the section on organic free radicals has been shifted to the end of Volume IV. Collaborators in the preparation of the German text included F. Arndt, A. Butenandt, F. Kochussen, R. Tscheschе, and A. Weissberger. Translation from the German was made by A. J. Mee.

One new feature of the present edition is that, wherever possible, the references are given to the orginal journals and not to *Chemisches Zentralblatt*, and that names of the authors have been added. The book is divided into two main parts, mononuclear aromatic compounds—benzene derivatives, and multinuclear aromatic compounds, with numerous chapter headings and subheadings under each part. The compounds are taken up first by classes, with information on methods of preparation, reactions, and derivatives, and then with additional detailed data on the individual compounds in the class. Coverage is very comprehensive and there are extensive references to the literature and an 80-page index of compounds. The book will be invaluable as a reference work both by itself and in combination with the other three volumes of the series.

NEW PUBLICATIONS

"The Arneels As Plasticizers." Armour Co., Chicago, Ill. 4 pages. This bulletin discusses the efficiency, compatibility, processing characteristics, and other applicable factors covering the use of Arneels TO, TOD, T and HT as plasticizers. Properties of the materials are given, together with test results obtained by the use of Arneels TO and TOD in a typical Buna N rubber.

"Indonex Rubber Plasticizers." Bulletin No. 13A (Continuation of Bulletin No. 13.) Standard Oil Co. (Indiana), Chicago, Ill. 26 pages. This supplementary bulletin presents further data on Indonex plasticizers to show their versatility of application. After a review of the properties of the Indonex materials, there are sections giving test data on their effect on water absorption by GR-S compounds, and their use in footwear compounds, GR-S whole tire reclaim carcass stocks, GR-S heat-resistant low compression set compounds, GR-S extruded compounds, neoprene soft roll stocks, black and red neoprene inner-tube stocks, Buna N compounds, blends of natural rubber and GR-S, and in natural rubber compounds.

"The Neoprene Notebook. No. 36." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. June, 1946. 8 pages. This issue contains articles on neoprene applications, including neoprene solid tires, an insert for a new tool holder, a bag for a new hydraulic accumulator, cable insulation, coatings for papermaking and other industries, and the use of neoprene tubing in a new check valve.

"Barrett Rubber Compounding Materials." Rubber Laboratory Release No. 3. Barrett Division, Allied Chemical & Dye Corp., New York, N. Y. August 5, 1946. 24 pages. Extensive laboratory data are included in this bulletin on the effect of Cumars P-10, P-25, and RS. Bardol, B.R.V., and Dispersing Oil #10 on the properties of an EPC black GR-S formulation. Data given cover tension, tear resistance, abrasion resistance, resilience, compression set, and hysteresis.

Publications of Carbide & Carbon Chemicals Corp., New York, N. Y. **"Aldehydes."** 16 pages. This bulletin gives physical properties specifications and solubility charts for five aldehydes, with some discussion of their applications in the chemical synthesis of rubber accelerators and synthetic resins. **"Ketones."** 24 pages. Data are presented on eight ketones for properties, solubility, specifications, and containers. There are graphs on various properties, a table of constant boiling mixtures, and a bibliography of references to ketones in the technical literature.

"Rubber Statistical Bulletin." London Rubber Secretariat, Brettenham House, 5/6 Lancaster Place, London, W. C. 2, England (Distributor for U. S. A., INDIA RUBBER WORLD.) Vol. 1, No. 1. July, 1946. 45 pages. Price 50c a copy. Annual subscription $5. The first issue of this bulletin, the availability of which was announced in our August issue on page 693, has been received. The information presented on natural, synthetic, and reclaimed rubbers is well arranged and detailed. The bulletin is divided into two parts. In Part 1 the more important tables and the summary tables have been printed in heavy type. Details of he figures in the tables in Part 1 and other special information are given in ordinary type in the tables in Part 2. In Part 1 the production and exports of natural rubber in principal territories are given from 1941 through April, 1946, with the figures for 1946 reported monthly. Net imports and consumption of natural rubber are given in the same manner from 1939 through May, 1946. Production and consumption of synthetic rubber are shown from 1939 through May, 1946, and exports and world stocks are given from 1941 through May, 1946. In Part 2 detailed figures are given through May, 1946, and figures on exports, imports, consumption, and stocks of natural rubber latex from 1942 through May, 1946, are also provided. Tables for the production, exports, imports, consumption, and stocks of reclaimed rubber are also found in Part 2. The rubber position in the United States, United Kingdom, Canada, France, and Ceylon are detailed for January-March 1946. Consumption by products for the United Kingdom and France is included in this issue and similar figures for the U. S. A. are expected in later bulletins. A special supplement in this first issue gives figures of net exports, net imports, consumption, stocks, and prices of natural rubber from 1910 to 1941.

"Effect of Copper on Shelf Aging of Natural Rubber and GR-S." Booklet No. 16, July 1, 1946. R. T. Vanderbilt Co., Inc., 230 Park Ave., New York 17, N. Y. 8 pages. This report presents a comparison of the shelf aging properties of a rubber, a GR-S, and a rubber-GR-S compound both with and without small amounts of copper. Test data are given to show that, in these rubbers, percentages of copper up to 0.10% in elementary form, or 0.02% in combined form, do not appreciably affect natural aging properties. Also, in compounds containing natural rubber, AgeRite White is effective in inhibiting any deleterious action of copper.

"Compounds for High-Temperature Service." Tentative Supplement No. VII, Section No. VII. Stanco Distributors, Inc., 26 Broadway, New York 4, N. Y. 6 pages. Two formulations of Perbunan 26 for high-temperature service are given herein, together with extensive test data on physical properties at room temperature and at 212° F. of the original vulcanizates and after various aging treatments. Graphs of the stress-strain properties show the effect of aging on the two compounds.

"How to Use DC 996." Resin Series No. 1. Dow Corning Corp., Midland, Mich. 4 pages. This pamphlet is designed primarily for men operating rewind and electrical maintenance shops and contains practical instructions on how to apply and cure DC 996. Also included are tables on the properties and specifications of the material and a summary of the advantages resulting from use of this silicone varnish.

"Cotton Production and Distribution. Season of 1944-45." Bulletin 182. United States Department of Commerce, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 66 pages. 15¢. **"Gaskets:** Rubber (Natural or Synthetic) Molded, Sheet, and Strip." Federal Specification HH-G-156b. January 4, 1946. Superintendent of Documents, Washington, D. C. 5¢. **"Ideal Machinery Products."** Ideal Industries, Inc., 1296 Park Ave., Sycamore, Ill. 24 pages. **"1946 Passenger Car Handbook."** The Tire & Rim Association, Inc., 2001 First-Central Tower, Akron 8, O. 30 pages. 50¢. **"Pass Book to Industrial Safety."** Greater New York Safety Council, 60 E. 42nd St., New York, N. Y. 12 pages. Publications of The British Rubber Producers Research Association, 48 Tewin Rd., Welwyn Garden City, Herts, England. **"The Elasticity of a Network of Long-Chain Molecules. III."** L. R. G. Treloar. Publication No. 68. 16 pages. **"The Statistical Length of Long-Chain Molecules."** L. R. G. Treloar. Publication No. 69. 12 pages.

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Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	June, 1946		June, 1945	
UNMANUFACTURED	Quantity	Value	Quantity	Value
Balata . . . . lbs.	1,500	$ 4,973	......	......
Crude rubber . . . . lbs.	302,288	47,201	878,510	$ 282,004
Gutta percha . . . . lbs.	1,000	2,939	100	99
Latex . . . . lbs.	76,435	49,184	5,333	2,560
Rubber, powdered, and waste . . . . lbs.	1,421,400	22,641	363,400	10,763
Recovered . . . . lbs.	1,802,100	151,138	1,801,000	131,401
Synthetic and substitute . lbs.	379,500	103,794	562,700	204,057
TOTALS	3,984,223	$ 381,870	3,611,043	$ 630,884
PARTLY MANUFACTURED				
Hard rubber in rods or tubes . lbs.	3,814	2,665	1,334	$ 1,133
Rubber thread, not covered . lbs.	5,034	5,764	5,003	8,469
TOTALS	8,848	$ 8,429	6,337	$ 9,602
MANUFACTURED				
Belting	......	$ 42,706	......	$ 41,062
Boots and shoes of rubber, n.o.p . . . . prs.	11,779	7,111	9,828	12,403
Canvas shoes with rubber soles . . . . prs.	135	468	......	......
Cement	......	35,859	......	12,545
Clothing of waterproofed cotton or rubber	......	4,351	......	611
Druggists' sundries	......	36,993	......	26,311
Gaskets and washers	......	18,634	......	15,611
Gloves . . . . doz. prs.	817	2,999	539	2,766
Golf balls . . . . doz.	364	1,827	70	110
Heels . . . . prs.	2,282	253	......	......
Hose	......	29,614	......	22,687
Hot water bottles	......	3,607	......	116
Inner tubes, n.o.p . . . . no.	309	1,529	35	113
Bicycle . . . . no.	2,580	1,716	1,200	645
Liquid sealing compound	......	13,820	......	7,385
Mats and matting	......	30,653	......	12,188
Nursing nipples . . . . gross	1,039	3,610	1,02[illegible]	4,521
Packing, rubber	......	12,420	......	13,618
Raincoats . . . . no.	4	50	......	......
Tire repair material	......	4,523	......	6,738
Tires, pneumatic, n.o.p . . . . no.	391	18,545	101	4,451
Bicycle . . . . no.	2,682	3,392	[illegible]	631
Solid for automobiles and motor trucks . . . . no.	6	216	[illegible]	911
Other	......	957	......	1,320
Other rubber manufactures	......	266,125	......	213,985
TOTALS	......	$ 541,978	......	$ 400,728
TOTALS, RUBBER IMPORTS	......	$ 932,277	......	$1,041,214

Exports of Crude and Manufactured Rubber

UNMANUFACTURED				
Crude rubber, including synthetic rubber . . . . lbs.	1,305,981	$ 266,819	2,725,091	$1,048,088
Waste rubber . . . . lbs.	1,563,700	23,913	5,427,800	47,737
TOTALS	2,869,681	$ 290,732	8,150,891	$1,095,825
PARTLY MANUFACTURED				
Soling slabs of rubber . . . . lbs.	1,605	$ 1,653	42,054	$ 10,002
MANUFACTURED				
Bathing caps	......	176	......	......
Belting, n.o.p. . . . . lbs.	340,043	$ 206,792	136,116	$ 74,673
Belts, fan	......	6,495	......	......
Boots and shoes of rubber, n.o.p. . . . . prs.	125,972	197,268	217,581	406,975
Canvas shoes with rubber soles . . . . prs.	47,740	49,040	45,604	44,270
Clothing of rubber and waterproofed clothing	......	14,,997	......	17,303
Heels . . . . prs.	142,471	12,773	226,074	37,934
Hose	......	54,579	......	80,314
Inner tubes for motor vehicles . . . . no.	50,011	106,257	41,483	170,654
Soles . . . . prs.	94,367	15,868	38,129	13,105
Tires, pneumatic for motor vehicles . . . . no.	41,700	744,143	42,487	1,865,464
Other . . . . no.	306	2,942	1,504	202,244
Wire and cable, copper, insulated	......	75,307	......	328,017
Other rubber manufacturers . .	......	39,843	......	337,054
TOTALS	......	$1,526,480		$3,578,007
TOTALS, RUBBER EXPORTS	......	$1,818,865	......	$4,683,834

Market Reviews

COTTON & FABRICS

New York Cotton Exchange
Week-end Closing Prices

Futures	June 29	July 27	Aug. 3	Aug. 10	Aug. 17	Aug. 24
Sept.	31.08	32.42	33.99	36.11	35.94	35.99
Nov.	31.15	32.40	34.00	36.13	35.92	35.96
1947						
Feb.	31.17	32.20	33.97	36.14	35.85	35.82
Apr.	31.08	31.83	33.81	35.91	35.62	35.58
June	30.99	31.37	33.53	35.56	35.20	35.15
Aug.	30.73	30.49	32.73	34.58	33.85	35.13

COTTON prices, motivated by uncertainty in the trade, fluctuated widely last month. Opening day in the August market saw the 15/16-inch spot middling price at the low for the month, 34.59¢ a pound. Advancing steadily to 36.88¢ a pound on August 9, prices then fell off and later fluctuated to close at 37.12¢ (high for the month), on August 30.

The futures market registered 33.75¢ a pound on August 1, broke through the 36¢ level on August 9, when the price registered 36.07¢, then fluctuated widely to close at the high for the month of 36.25¢ on August 30.

Major factor causing the wide gains in the market last month was the cotton production estimate of the Department of Agriculture. A forecast of 9,290,000 bales in the 1946 crop, as of August 1, indicated that the total supply available for both foreign and domestic consumption for the next year will be at the lowest level in 18 years. The Department also pointed out that the crop may not turn out so large as forecast because of the serious boll weevil threat and generally unfavorable weather. Domestic consumption is expected to total about 9,300,000 bales this season, and foreign demand about 3,500,000 to 4,000,000 bales. Also the Senate Agricultural Committee revealed that of the 7,600,000 bales seen as prospective carryover for 1946, 2,294,000 bales are untenderable on futures contracts. This fact coupled with the demand by the CCC to meet commitments to the UNRRA and the occupation authorities in Europe and Japan indicates the dangerously low carryover for August, 1947, of about 3,500,000 bales.

However a depressing factor in the market was the hesitancy of mills to enter into forward contracts caused by the reinstatement of textile ceilings set on a monthly basis. With the sharp rise in the cost of raw cotton since the base cost was set at 32.78¢ a pound, processors urged that the cost bases be established daily to prevent undue hardship; however the OPA claimed that this plan would be administratively impractical though there was some indication that the bases might be changed to a two-week period.

Cotton warehousing and cotton compressing services have been exempted from price control to conform with the new Price Control Act. All pricing actions relating to these services have been revoked as of July 25, 1946. The new PCA provides that no maximum price, regulation, or order "shall be applicable with respect to any agricultural commodity, or any service rendered with respect to any agricultural commodity, unless a regulation had been issued under this act prior to April 1, 1946." Since no regulation fixing a maximum price for cotton or any service relating to cotton was issued before April 1, the agency is prohibited from placing cotton under price control.

Another question causing uncertainty in the trade is the cotton subsidy. The State Department is renewing its campaign for the removal of the cotton export subsidy. But the Department of Agriculture is convinced that the removal of the subsidy would result in excessive carryover stocks despite the tight supply and necessitate the reimposition of marketing quotas by 1948.

Concerning the export outlook, the Export-Import Bank has already extended $93,000,000 credit to finance cotton exports under special credit pool arrangements and expects that additional funds may be made available to other countries including Belgium and Austria. It is reported that although China has fully utilized its cotton credits, it is seeking additional credit. Spain is alleged to be seeking a private banking credit of $20,000,000 with which to buy American cotton and to eliminate the present Export-Import Bank credit. Exporters have reported that the demand for cotton is falling off and contend that based upon spinning capacity of Europe today, European mills have purchased enough cotton to last through the first of 1947.

With the July 15 parity set at 24.38¢ a pound for middling 15/16-inch cotton, on which loans are to be based for the new season, it was felt generally that little of the new yield will find its way into the loan, perhaps not even as much as went in during the past season when the total was but little over 200,000 bales. It was also announced by the CCC that the 1945 cotton loan program totaled 49,165 bales on July 27 and that the stock will be pooled October 1, although no further loans would be entered as of July 31.

On August 13 the Department of Agriculture stated that it would offer to make loans to growers of American-Egyptian-type cotton at rates averaging 6.8¢ a pound above those offered under a similar price supporting program last year.

Fabrics

The fabrics market was almost completely withdrawn during August, pending further price increases. The textile industry generally felt the price increases granted by the OPA (an overall average of 17%) insufficient to bring about any volume selling. The general expectancy is that the next named prices by the OPA will be about 8% to 10% higher than those prevailing during August, in order to reflect the inclusion of the wage increase determination by the National Wage Stabilization Board and the higher raw cotton costs that have occurred in the interval since the OPA first set prices.

The industry advocates daily escalation of cotton goods price ceilings, based on fluctuations in raw cotton; however OPA claims that such a change would involve administrative, compliance and enforcement problems that it could not solve. A compromise was reached by which monthly cotton textile prices will be based on the average of raw cotton prices in a two-week period, after September.

With the current OPA price ceilings based on 32.75¢ a pound for raw cotton, the price of 12/4/2 karded peeler 1/16-inch cotton cord fabrics has been changed to 68.36¢ a pound, and producers' ceilings for hose and rubber belting duck have a base price of 61.87¢ a pound, subject to plus or minus differentials for yarns, thread count, weight, etc.; terms net ten days f.o.b. mill.

The Bureau of Census announced that 131 million pounds of tire cord and fabrics were produced in the April to June, 1946, period. Of the total produced 78,500,000 pounds were of cotton, and 52,500,000 pounds were rayon and nylon, an increase in production of 6.5% over the first quarter of 1964.

RECLAIMED RUBBER

ALTHOUGH the demand for all types of reclaimed rubber remained high, there were some indications last month that the supply of reclaim was finally beginning to catch up somewhat with demand. Some slackening in orders was noticeable and was probably attributable to shutdowns and strikes in customers plants. The system adopted by reclaimers of allocating their production to prewar and wartime consumers remained in effect. The continued operation of the reclaim industry at top speed, coupled with the decreased demand, gave rise to some instances where customers were unable to take their complete allocations, and the material was therefore being sold to new customers not on the allocation lists.

This slightly reduced demand in part explains the steady increase in stocks on hand of reclaim during this year, although totals are still far below prewar levels. Data available for the first five months of 1946 on end-of-month stocks show 29,099, 30,126, 31,436, 31,666, and 33,597 long tons, respectively. Other final statistics on the reclaim industry for April and May of this year are now available, supplementing those given in our July issue. Production of reclaim in April totaled 23,937 long tons; while May figures were 25,327 long tons. Exports of reclaim also rose, totaling 1,238 long tons in April and 1,338 long tons in May. Consumption during May dropped to 22,124 long tons from the April total of 22,469 long tons.

Reclaimed Rubber Prices

	Sp. Grav.	¢ per Lb
Auto Tire		
Black Select	1.16-1.18	7½ / 7¾
Acid	1.18-1.22	8½ / 8¾
Shoe		
Standard	1.56-1.60	8 / 8¼
Tubes		
Black	1.19-1.28	12¼/12½
Gray	1.15-1.26	13 /14
Red	1.15-1.32	13 /13½
Miscellaneous		
Mechanical blends...	1.25-1.50	5½/ 6½

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

SCRAP RUBBER

THE scrap rubber market remained in an almost complete state of apathy during the past month, with the return of price control having little effect. Scrap dealers reiterated that it was not profitable to supply what small demand there was in the face of a mounting number of restrictions.

The recently imposed advance in freight rates has become one of the more particular headaches of the scrap rubber trade. Previously the ICC ordered an increase in interstate freight rates of 11.3% in official classification territory (including New York), and in addition New York State has sanctioned a rise of 6% in freight rates for intrastate movement. In essence this rise in freight rates has placed an added burden on the already harassed shipper of rubber scrap who has to contend with percentages of synthetic, possible rejections, and many more eventualities.

Dealers say that rejections have been becoming more and more frequent. Trade factors pointed out that only one mill, in the East, has made no specific demands with regard to percentage of synthetic in shipments. Other consumers in Akron and in the East restricted shipments to 15% synthetic, with dealers liable to a penalizing charge unless the two grades are segregated. Stringent requirements are also set forth in Akron on the percentage of truck and bus tires in a given shipment. Dealers there are restricted to 25% truck and bus; while one southern mill requires 50% passenger tires. Beset by these difficulties, trade quarters state they are not assured of a fair return for their work, with the result that movement of tires and tire parts is down to a minimum.

It is reported that synthetic tire parts are simply unsalable. Supplies of synthetic peelings are available in fairly large-size quantities, but dealers are afraid to handle this material since no consumer outlets exist at present. Dealers further reveal that the tires are becoming too unprofitable to move.

Although some trading for export is taking place, dealers minimize this by pointing out that the tonnages involved are too small to be of any consequence. Export inquiries are frequent, but the specifications for such exportable rubber scrap are too stringent. Besides the expense and trouble involved in shipping supplies out of the country tend to discourage American shippers. Most export shipments are of less than 100 tons, and the specifications usually call for 100% natural rubber scrap tires and tubes, requirements that dealers say can hardly be met.

Following are dealers' buying prices for scrap rubber, free of synthetic, in carload lots, delivered points indicated. Prices are unchanged from last month's listing.

	Eastern Points (Net Tons)	Akron, O.
Mixed auto tires	$17.50	$18.00
Truck and bus tires	17.50	17.00
Beadless tires	23.00	24.00
S.A.G. passenger (natural)	17.50	18.00
S.A.G. passenger (synthetic)	nom.	nom.
S.A.G. truck (natural)	15.50	nom.
S.A.G. truck (synthetic)	nom.	nom.
No. 1 peelings (natural)	44.00	nom.
No. 1 peelings (synthetic)	nom.	nom.
No. 1 peelings (recap)	37.00	nom.
No. 2 peelings (natural)	30.00	30.00
No. 2 peelings (synthetic)	nom.	nom.
No. 2 peelings (recap.)	23.00	nom.
No. 3 peelings (natural)	28.00	28.50
No. 3 peelings (synthetic)	nom.	nom.

	(¢ per lb.)	
Mixed auto tubes	5.5	5.25
Red passenger tubes	7.25	7.25
Black passenger tubes	6.25	6.25
Black truck tubes	6.0	6.125
Mixed puncture-proof tubes	2.0	2.0
Air brake hose	nom.	nom.
Rubber boots and shoes	nom.	nom.

Compounding Ingredients Price Changes

Albalith lithopone	lb.	$0.44 /	$0.0465
Cryptone ZS No. 800	lb.	.084 /	.0865
Marbon S	lb.	.52 /	.65
S-1	lb.	.52 /	.65
Koresin	lb.	.40 /	.52
Statex B	lb.	.0525 /	.09

Carbon Black

Conductive Channel—CC

Continental R-20	lb.	.055 /	.102
R-40	lb.	.055 /	.102
Spheron C	lb.	.0505	
I	lb.	.0455	
N	lb.	.155	
Voltex	lb.	.11 /	.15

Hard Processing Channel—HPC

Continental F	lb.	.055 /	.102
HX	lb.	.055 /	.117
Kosmobile S/Dixiedensed S	lb.	.055 /	.0825
Micronex Mk. II	lb.	.055 /	.097
Spheron #4	lb.	.055 /	.0725
Witco #6	lb.	.055 /	.102

Medium Processing Channel—MPC

Arrow TX	lb.	.055 /	.117
Continental A	lb.	.055 /	.102
Kosmobile S-66/Dixiedensed S-66	lb.	.055 /	.0825
Micronex Standard	lb.	.055 /	.097
Spheron #6	lb.	.055 /	.0725
Witco #1	lb.	.055 /	.102

Easy Processing Channel—EPC

Continental AA	lb.	.055 /	.102
Kosmobile 77/Dixiedensed 77	lb.	.055 /	.0825
Micronex W-6	lb.	0.55 /	.097
Spheron #9	lb.	.055 /	.0725
Witco #12	lb.	.055 /	.102
Wyex	lb.	.055 /	.117

Fixed Government Prices*

	Price per Pound: Civilian Use	Other Than Civilian Use
Guayule		
Guayule (*carload lots*)	$0.17½	$0.31
Latex		
Normal (*tank car lots*)	.26	.43½
Creamed (*tank car lots*)	.26¾	.44¼
Centrifuged (*tank car lots*)	.27¾	.45¼
Heat-Concentrated (*carload drums*)	.29½	.47
Plantation Grades		
No. 1X Ribbed Smoked Sheets	.22½	.40
1X Thin Pale Latex Crepe	.22½	.40
2 Thick Pale Latex Crepe	.22	.39½
1X Brown Crepe	.21⅜	.38⅞
2X Brown Crepe	.21⅛	.38⅝
2 Remilled Blankets (Amber)	.21¼	.38¾
3 Remilled Blankets (Amber)	.21⅛	.38⅝
Rolled Brown	.18	.35½
Synthetic Rubber		
GR-M (Neoprene GN)	.27½	.45
GR-S (Buna S)	.18½	.36
GR-I (Butyl)	.18½	.33
Wild Rubber		
Upriver Coarse (crude)	.12⅝	.26⅛
(washed and dried)	.20¼	.37¾
Islands Fine (crude)	.14⅝	.28¼
(washed and dried)	.22½	.40
Caucho Ball (crude)	.11⅝	.24¾
(washed and dried)	.19½	.37
Mangabiera (crude)	.08½	.19¾
(washed and dried)	.18	.35½

* For a complete list of all grades of all rubbers see Rubber Reserve Co. Circular 17, p. 169, May, 1943, issue.

Rims Approved and Branded By the Tire & Rim Association, Inc.

Rim Size	July, 1946
15" & 16" D. C. Passenger	
16x4.00E	405,304
16x4.50E	175,920
15x5.00E	126,191
16x5.00E	12,450
16x5.00F	8,216
15x5.50F	35,527
16x5.50F	2,594
16x6.00F	549
16x4.00E—Hump	286,150
15x4.50E—Hump	48,459
15x4.50E—Hump	4,444
15x5-K	11,194
16x5-K	123,983
16x6-L	85,669
15x6-1/2-L	32,199
17" & Over Passenger	
18x2.15B	1,356
18x4.00F	1,543
18x6-L	2,956
Flat Base Truck	
17x4.33R	2,898
20x4.33R	69,220
15x5.00S	5,369
18x5.0	5,258
20x5.0	9,411
20x5.00S	156,905
24x5.00S	815
20x6.0	4,361
20x6.00T	50,530
20x7.00T	5,136
18x7.33V	1,230
20x7.33V	26,960
22x7.33V	1,321
24x7.33V	3,037
20x8.37V	826
24x8.37V	790
Semi D. C. Truck	..
16x4.50E	20,223
15x5.50F	5,841
16x5.50F	2,740
Tractor & Implement	
12x3.00D	1,165
15x3.00D	14,484
16x3.00D	165
17x3.25E	1,557
18x5.50F	2,573
16x4.25K	4,197
24x5.50R	924
20x8.00T	936
24x8.00T	3,580
W7-24	855
W8-24	4,502
W9-28	3,630
W9-38	4,023
W10-36	2,850
W10-38	8,681
W10-40	925
DW10-38	4,911
Earth Mover	
24x15.00	311
TOTAL	1,797,844

Trade Marks

(*Continued from page 858*)

421,305. **Black Diamond.** Softening agent for compounding rubber. Witco Chemical Co., Chicago, Ill.

421,342. **Duron.** Raw or partly prepared molding powders or granules composed of plastics, synthetic resins and/or chlorine-containing rubber or synthetic rubber compounds including rubber chloride and rubber hydrochloride for the manufacture of sheets, rods, tubes, films, supported or unsupported, and plastic molded products. Firestone Tire & Rubber Co., Akron, O.

421,345. The word: **"Resistoflex,"** superimposed upon the letter **"R."** Liquid compositions for coating shoes. Resistoflex Corp., Belleville, N. J.

421,398. Representation of a label containing the word: **"Gates."** Gasoline dispensing nozzles. Gates Rubber Co., Denver, Colo.

421,412. **Gary the Gator.** Alligator caricature toy. Firestone Tire & Rubber Co., Akron, O.

421,422. **SAB.** Brakes. Svenska Atkiebolaget Bromsregulator, Malmo, Sweden.

421,441. **Wampum.** Footwear Shoecraft, Inc., New York, N. Y.

421,466. **Durecap.** Camelback tire tread gum. B. F. Goodrich Co., New York, N. Y.

421,479. Representation of a label divided into four squares of two contrasting colors with the word: **"Canadex,"** written thereon. Raincoats. Baxter, Woodhouse & Taylor, Ltd., Stockport, England.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)
Allow nine words for keyed address.	**Address All Replies to New York Office at 386 Fourth Avenue, New York 16, N. Y.**	*Replies forwarded without charge*

SITUATIONS OPEN

RUBBER LABORATORY DIRECTOR

Nationally known organic chemical manufacturer and supplier to the rubber industry desires experienced man for permanent position to direct new compounding research and sales service laboratory being built in the East. Salary open, commensurate with ability and experience. All replies confidential. Present personnel know of this advertisement.

Box 607,
Care of INDIA RUBBER WORLD

CHEMIST

Young man with some experience in mechanical or sponge rubber for laboratory development and production control work. Factory located in Connecticut. Give full details first reply.

Address Box No. 609
Care of INDIA RUBBER WORLD

POSITION OPEN—AN OLD-ESTABLISHED CHICAGO CONCERN in the stationery manufacturing field opening a small (3 mills) rubber division with excellent prospects of further expansion needs man to assist General Manager in production and development end. Must have substantial practical experience in production problems and some laboratory and compounding experience with small- to medium-size concerns. A life-long opportunity for a builder who is willing to start at a fair salary and grow with the results he can achieve. State complete experience and salary expected in first letter. Address Box No. 614, care of INDIA RUBBER WORLD.

CHEMIST

Calendering, coatings, adhesives. Compounding. Elastomers and resins. Permanent. New York City. Our staff knows of this opening. Please write in detail. Address Box No. 615, care of INDIA RUBBER WORLD.

EXPERIENCED RUBBER CHEMIST AND PRODUCTION TECHNICIAN

Long established, expanding manufacturer in Chicago vicinity is creating this new staff position. Qualifications desired include full technical training and experience in formulating natural and synthetic compounds for highly specialized purposes, and in close control of quality and production, using latest proved engineering methods and equipment. Company has excellent employment history, reflected in extremely low turnover of all personnel. National market. Liberal salary, bonus, retirement annuity, group life and hospitalization insurace, etc. Your inquiry will be treated in strictest confidence. Give full background. Please! Address Box No. 616, care of INDIA RUBBER WORLD.

CHEMIST—Experienced in compounding research and factory processing of natural and synthetic rubber. Knowledge of molded and braided hose and industrial tires beneficial. Responsible position with growing concern. Please forward age, complete qualifications, experience, and salary expected. Address Box No. 625, care of INDIA RUBBER WORLD.

SITUATIONS OPEN (Continued)

WANTED: SUPERINTENDENT, PREFERABLY ENGINEERING graduate, thoroughly experienced in the manufacture of molded, extruded, and wrapped items. An unusual opportunity for the man who can qualify. Address Box No. 628, care of INDIA RUBBER WORLD.

DEVELOPMENT CHEMIST, YOUNG, WITH SEVERAL YEARS' experience in rubber industry for development work on synthetic rubbers, adhesives, plastics used in fabric coatings. Excellent opportunity, Metropolitan New York Area. In reply give complete résumé and minimum salary requirements. Enclose small photo. Address Box No. 630, care of INDIA RUBBER WORLD.

WANTED: CHEMIST OR TECHNICAL MAN FAMILIAR WITH manufacture of molded brake lining and brake blocks, both automotive and industrial, to supervise production of plant located in the South. Advise experience and salary. Address Box No. 631, care of INDIA RUBBER WORLD.

SITUATIONS WANTED

RUBBER CHEMIST—AGE 34, WILL BE RELEASED FROM ARMY in September. Experienced in variety of products of synthetics and natural rubber, specializing in solvent resisting items. Can develop and manufacture any product. Experienced in management. Business ability. Desires permanent position, preferably with remuneration based directly upon results, such as commission or partnership. Character, ability, honesty unquestionable. Willing to pioneer. Address Box No. 610, care of INDIA RUBBER WORLD.

TECHNICAL DIRECTOR: THOROUGHLY EXPERIENCED IN soft and hard sponge elastomers, latex processing, rubber bonding, synthetic organic chemicals. 20 years' supervision, direction, coordination, and pursuit of research and developments. Excellent collegiate training. Recent technical director available immediately. Residence important. Location immaterial. Address Box No. 611, care of INDIA RUBBER WORLD.

ORGANIC RESEARCH CHEMIST, RECENT Ph.D., LEADING technological institute. Qualified for laboratory research on purification and fractionation of rubber; its structural study by chemical degradations; utilization of rubber as raw material for new plastics and other substances. Address Box No. 612, care of INDIA RUBBER WORLD.

WANTED: POSITION AS SALESMAN WITH HEADQUARTERS in Cleveland to call on northern Ohio paint and rubber manufacturers. Approximately 20 years' experience in raw materials. Now employed, but desire change. Address Box No. 613, care of INDIA RUBBER WORLD.

VICE PRESIDENT AND GENERAL MANAGER OF MECHANICAL rubber goods plant employing over 100 people desires making a change. Justifiable reasons. Twenty years' experience—knowledge of all phases. Started present plant into operation. Age 44; health, good. Address Box No. 622, care of INDIA RUBBER WORLD.

FACTORY REPRESENTATIVE WITH OFFICE AND AUTOMOBILE IN PHILADELPHIA seeks new connection, as present connection is withdrawing from his territory. Interested in representing a manufacturer of molded rubber parts or items, lathe-cut washers and extruded sections, also sponge rubber products in Philadelphia and adjacent territory, commission basis. Now selling only mechanical rubber products to an established clientele. Address Box No. 623, care of INDIA RUBBER WORLD.

TECHNICAL SALES OR SALES SERVICE POSITION IN THE rubber or rubber chemicals field desired by young man, 28, with good knowledge of mechanical rubber products and bonding mediums. Experience includes development, compounding, production, supervision, and sales service. Address Box 624, care of INDIA RUBBER WORLD.

CHEMIST—11 YEARS' EXPERIENCE IN BASIC SYNTHETIC research, development, compounding of all types, laboratory management, sales development, technical sales, and management of a small company. Thoroughly familiar with costs and the engineering possibilities of rubber and synthetics. Widely known to the rubber trade. Interested in a technical sales or management position either in the rubber trade or suppliers to or consumers of rubber products. Address Box No. 626, care of INDIA RUBBER WORLD.

EMULSIONS AND RESINS: CHEMIST WITH 19 YEARS' EXperience in development and supervision of production of surface coatings, which include pigment dispersions, resin emulsions, ethyl cellulose lacquer emulsions, wax finishes, and adhesives. Desires responsible position with progressive organization. Chicago area. Address Box No. 632, care of INDIA RUBBER WORLD.

VETERAN, 35 YEARS' OLD, PERFECT KNOWLEDGE FRENCH, Spanish, German, Dutch, Flemish, export and rubber, seeks position. Address Box No. 635, care INDIA RUBBER WORLD.

Classified Advertisements
Continued

BUSINESS OPPORTUNITIES

NATURAL GAS CARBON BLACK. European agency desired by old-established British Chemical concern, desirous change existing sales arrangements. Established trade mark for Blacks and participation in quota British imports. Associated Company one of the largest and oldest suppliers raw rubber Great Britain. Branches U. K., and agencies principal European cities. May consider formation joint Company U. S. A. Director visiting U. S. A. September. Replies treated as confidential. Address Box No. 617, care of INDIA RUBBER WORLD.

RUBBER FACTORY WANTED, LEASE OR FREEHOLD, WITH milling capacity of about one ton of stock per day. Space approximately 15,000 square feet. Address Box No. 619, care of INDIA RUBBER WORLD.

WANTED: PRODUCTION CAPACITY ON BOTH EXTRUDED and molded rubber goods by distributer with extensive sales contacts. Either small or large quantities. Advise type of business you can handle. Address Box No. 634, care of INDIA RUBBER WORLD.

EUROPEAN INDUSTRY

Chemical Engineer experienced formulation and processing, leaving several months' trip western European countries Interested representing American firms and introducing modern improvements, industrial products, chemicals, machinery, rubber plastics field. Address Box No. 636, care of INDIA RUBBER WORLD.

Classified Advertisements
Continued

MACHINERY AND SUPPLIES FOR SALE

LIQUIDATING: Land, Buildings, Machinery, Equipment, Supplies, Office Equipment of former THERMOID OF CALIF. Plant (previously Grizzly Mfg. Co.) including Rubber Mills, Calenders, Tubers, Vulcanizers, Hose Building Machinery, Fabric Dryers, Hydraulic Presses, Pumps and Accumulators, Hydraulic Cutters, 500′ Cleveland Tramrail, Metal Working Machinery, Woodworking Machinery, 3 Trucks, 1-, 1½-, and 5-ton, Compressors, Miscellaneous Tools, Welders, Hoists, etc. Representative on premises. Send for circular. Wire, Phone, Write—Consolidated Products Co., Inc., 637 S. Clarence St., Los Angeles, Calif. Telephone—Angeles 1-4151.

500-GALLON MANTON GAULIN HOMOGENIZER, SERIAL number C.G. 4336-271. Perfect condition. FRANK R. MARCHIONY, 574 W. 130th St., New York 27, N. Y.

FOR SALE: Adamson 6″ Extruder; 400-ton Hydraulic Extrusion Press, Hydraulic Presses from 12″x12″ to 42″x48″ Platens, from 50 to 500 tons. Hydraulic Pumps & Accumulators, Mixers, etc.
WE BUY YOUR SURPLUS MACHINERY
STEIN EQUIPMENT CO.
426 BROOME ST., NEW YORK 13, N. Y.

FOR SALE: 16′ x 4′ THROPP BELT PRESS, 2 PLATEN 16—9″ Rams. Inspection by appointment. Address Box No. 627, care of INDIA RUBBER WORLD.

FOR SALE: 1 EXPERIMENTAL, 2-OPENING, VULCANIZING press with 21″ x 21″ decks. 10 new heel or sole trimming machines complete with ball bearings. Address Box No. 629, care of INDIA RUBBER WORLD.

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Classified Advertisements

Continued

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We will trade our No. 11 Banbury, new in 1944, for an equally modern No. 3-A Banbury, plus the difference in value. Prompt delivery. Address Box No. 618, care of INDIA RUBBER WORLD.

WANTED TO BUY: Heavy-Duty Mixer, Vacuum, Steam-jacketed, Working Capacity—200 Gallons or Larger. Address Box No. 620, care of INDIA RUBBER WORLD.

WANTED
Rubber Refiner
21 & 24 x 36″
or approximate
THE NORWALK TIRE & RUBBER CO.
Norwalk, Conn.

WANTED: 1 Cameron cutting machine, Model 4-D Camachine No. 26, 50″ preferred. Address Box No. 621, care of INDIA RUBBER WORLD.

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For synthetic or natural rubber, latex, or reclaimed rubber compounding: especially fine for mechanical goods.

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New England Agents, Stock Carried, Berlow & Schlosser Co.
537 Industrial Trust Bldg., Providence, R. I.

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STOCK SHELLS HOSE POLES
MANDRELS

NATIONAL SHERARDIZING & MACHINE CO.

868 WINDSOR ST. HARTFORD, CONN.

Representatives
Akron San Francisco New York

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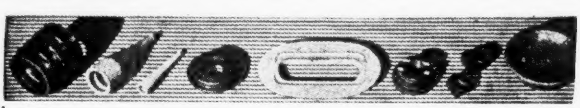
245 FIFTH AVENUE NEW YORK 16, N. Y.



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